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A SHORT INTRODUCTION

TO THE

STUDY OF LOGIC.

BY

LAURENCE JOHNSTONE.

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INTRODUCTION TO THE STUDY OF LOGIC.

INTRODUCTION.

DEFINITION AND DIVISION OF LOGIC.

I. **Logic,** called by Whately "the science and art of reasoning," and by John Stuart Mill "the science of evidence or proof," is the science of the forms of thought," or "of those laws on which depends the truth of thought," and is defined by St. Thomas: "The science which teaches man how to order aright the acts of the intellect in the pursuit and acquirement of true science;" and again: "The science of the order to be followed in the acts of the intellect in the pursuit and demonstration of truth." Suarez says: "It is the proper office of Logic to give the means of acquiring true science,—which is done by showing what are its instruments, and by demonstrating their power and properties."

These words of Suarez, and the first three of the six definitions enumerated, apply, strictly speaking, only to Formal Logic, or Dialectics, of which we shall speak just now: so that the choice of a general definition is restricted to the two statements of St. Thomas and the definition immediately preceding them; while it is clear that choice is merely a matter of form, as all three express precisely the same thing.

II. In all of them three things are either expressed or implied, viz., **A**, an **Agent**; **B**, an **Act** according to some law or order; **C**, an **End**.

The Agent is **man**; the Act is **reasoning**; the End is **Truth**.

According to this view, the subject admits of the following division:

A. Man, as the **agent of the act** of reasoning;

B. Reasoning—**the act of the agent**;

C. Truth and certainty—**the end of the agent's act.**

This is only another way of putting the Scholastic division of Logic into **Formal** and **Material**; Formal Logic or Dialectics answering to the act of the agent (see definitions at p. 10, et seq., referred to at p. 17); Material Logic, to the end of the act. And, as Truth is something else besides the end of the act of reasoning, as it can be gained in other ways, and is manifested by laws outside our minds,—and as Material Logic has Truth for its matter, it follows that these laws must fall within the scope of this Material Logic. In this division a knowledge of the agent of the act is presupposed.

A distinction is often made between **Natural** and **Artificial** Logic, Natural Logic means the natural reasoning that leads men to Truth, or that would do so, if it were possible for them always to follow the light of reason. Artificial Logic may be briefly called the science of Natural Logic, for it does no more than give an exact and methodical shape to the rules delivered by nature; just as in music, or painting, or sculpture, the technicalities of the art merely throw natural rules into order and method.

And, as the art-student naturally acquires delicacy of perception in all that concerns his art; so does the study of Logic give delicacy of intellectual touch to distinguish Truth, and a peculiar power of discerning Truth, and of unmasking error when it lurks under the guise of Truth.

III. This being so, it is evident that, although the task of putting due order into the discourse of the mind is far more difficult than success in art or in science, it is nevertheless far more necessary; and that in science Logic is itself the "instrument of knowledge," and so must precede its acquisition, as St. Thomas says: "Necessity requires that, although it is more difficult than many other sciences, we should in learning begin with Logic, because all other sciences depend upon it,"[1] that is, they depend so far as our knowledge is concerned, on the accuracy of thought gained by Logic, and on the application of its rules to the matter of the science.

[1] Opusc. 70.

A.

THE AGENT.

THE AGENT.[1]

I, Definition of the Agent. II. Powers of the soul. III. Powers of the intellect. IV. Action of the intellect.

I. Definition. From the time of Aristotle, man has been defined "a rational animal;" he is a complete substance, composed of two incomplete substances—the body and the soul; the body being the **matter** of the substance, and the soul its **form.**[2] Hence it is said that the soul "informs" the body; and hence it is, through the action of its powers, the principle of man's life and activity. Created by God, and placed in the body to rule and direct it, the soul is the stable and permanent element in all the various processes of what we vaguely call our minds; and, being in itself a spiritual substance, is capable of existing and acting without the body, though in this life the two are inseparably united, and so closely that it is impossible for the one to act without the other being in some way, either directly or indirectly, affected.

II. Powers of the soul. Inherent in the soul,

[1] This brief sketch merely treats of what it is necessary to know of the mind of man, in order to study and understand Logic aright.

[2] See p. 75.

and producing by their action one or other of man's many vital processes, are three classes of powers or faculties:

1. **Vegetative powers**—nutrition, growth, generation—which belong to the soul in virtue of its connection with the body, and are common to plants, animals, and men.

2. **Sensitive powers**—*e.g.*, senses, imagination, instinct, sensitive memory—which also belong to the soul in virtue of its connection with the body: they are common to the animals and men.

3. **Rational powers**—memory (rational), intellect or understanding, and will—which belong to the soul itself, and in virtue of its own nature; hence to man as man.

III. **Intellect or Understanding** contains within it three powers, viz.:

1. **Conception,** the faculty by which we form ideas;

2. **Judgment,** the faculty by which we join together two ideas;

3. **Reasoning,** the faculty by which we compare and weigh judgments, and therefrom deduce conclusions.

IV. **Action of the Intellect.** By this term we can understand the processes of the three intellectual powers just enumerated; and thus the first thing to be considered under it will be the exercise of **Conception** in the **Formation of ideas.** The mind is a tabula rasa before it receives any impressions from without. It receives impressions, or the matter for ideas, through the senses, upon which the impression is made. By means of the "sensus

intimus" man becomes conscious of these impressions, of which the imagination then forms a picture or phantasm. Up to this point the cognition is merely a sensitive or sensible one, like that of animals. But, from the picture on the imagination, the intellect draws that element which is akin to itself, that is the immaterial incorporeal element, throws it into its mould—so to say—and the result is the "species intelligibilis," formed in the intellect itself, and representative of the exterior thing. When informed by the "species intelligibilis" of a thing, the intellect simply names that thing to itself with a mental word; and the mind is conscious of the possession of its idea. It must be borne in mind that the "species intelligibilis" is, like the intellect itself, purely spiritual and immaterial, and so is in no sense pictorially representative of the external object of sense, as is the phantasm of the imagination. For instance: the eye sees a fan-tail, and thus there arises an external sensation; the consciousness of this sensation obtained by the "sensus intimus," supplies the matter for the phantasm of the fan-tail, which is next formed in the imagination; and then in the intellect the "species intelligibilis," or spiritual representation of the fan-tail comes into being; whereupon the intellect, then by a simple word, says in and to itself, fan-tail. Again, a boy sees a triangle, of which he has first of all an external sensation, made conscious to him by the "sensus intimus"; anon a picture of the triangle paints itself on his imagination; from this picture or phantasm, which is probably a very imperfect representation of a triangle, his intellect

extracts an universal, perfect, "ideal" triangle, and on this he argues, and deduces from it all its properties.

Thus much for the idea, which, so far from being the lengthy matter this explanation would seem to imply, is practically an almost instantaneous process, and a simple indivisible act. Hence we say that, an idea flashes upon us in an instant.

The next thing to be looked at is **Judgment,** that is, the way two ideas are joined together. Having two or more "species intelligibiles," the intellect in putting them together produces a complex word or idea, called a judgment, or more popularly a statement: for in English the term judgment is often applied in common parlance to the conclusion or result of a train of reasoning, of which we shall speak next. To illustrate this complex word, or statement, or judgment, we will go back to our fan-tail. The intellect has the "species intelligibilis" of fan-tail, and of, say, tame and wild. From them it produces a complex word, saying, the fan-tail is tame, or the fan-tail is not wild; in the first statement affirming something by a positive "judgment"; in the second, denying something by a negative "judgment." And so, too, with the boy and his triangle. If he has the "species intelligibilis" of triangle and of scalene and isosceles, he may affirm by a positive judgment that the triangle is scalene; or deny something by the negative judgment that the triangle is not isosceles.

Lastly, the faculty of **Reasoning** comes into play. The intellect passes from one complex word or judgment to another, compares them, and either

unites or separates them, and forms a new complex word or judgment, resulting from the comparison. For instance:

Every fish has fins;
But no fan-tail has fins;
Therefore no fan-tail is a fish.

When this new complex word or judgment, which is called the conclusion, is some truth which has no influence on our conduct, the faculty of Reasoning is called Speculative Reason. Instance the above comparison of fish, fins, and fan-tail; and again:

Secondary planets move round their primaries;
But the moon is a secondary planet;
Therefore the moon moves round its primary.

When the result of the argument is some action on our part, when we reason with a view to practice, the faculty is called the Practical Reason, and the process a practical one; *e.g.*, if I am led by the following argument to study the moon through a telescope, I exercise the Practical Reason:

Planets can only be satisfactorily studied through a telescope;
But the moon is a planet;
Therefore the moon can only be satisfactorily studied through a telescope,—and I must study it through a telescope.

And I employ the practical Reason when I argue that:

The means of advancing in my studies are to be adopted;
But steady conscientious application is a means of advancing in my studies;

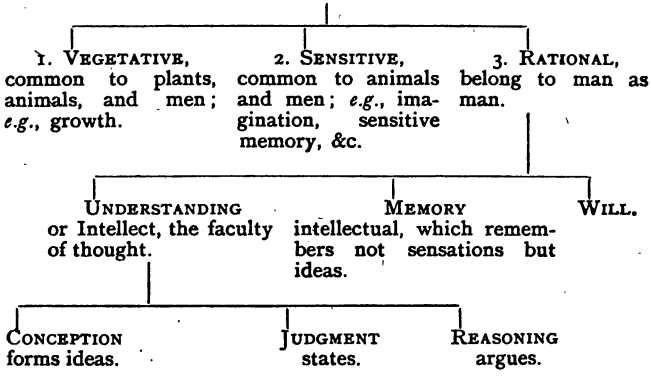
Therefore steady conscientious application is a habit to be adopted or acquired,—and one which I will do my best to acquire.

Thus a Speculative Process differs from a Practical one, not in itself, but in respect of the end or object to which it is directed. The same faculty is employed in either case: the only difference is in the result aimed at.

All this internal discourse of the mind is called **Reasoning,** and its end is the clear knowledge of Truth. The order in which these acts of the intellect should be arranged is called the Logical or Rational Order: and so we come to Logic itself, or the **Act of the Agent,** or **Formal Logic.**

Before passing on to it, however, the matter just treated of may be made clearer by the subjoined scheme.

Powers of the Soul.



B.

THE ACT OF THE AGENT,

OR

FORMAL LOGIC.

CHAPTER I.

I. Definition of the act. II. Division of the act. III. Matter of the act. IV. Definition of terms. V. Division of terms.

I. Definition. See pp. 10—14.

II. Division. In the "Act of the Agent" there are two things to be considered, viz., its **Matter** and **Form.** Having seen what Logic is, and having besides looked at the intellect of man, which is the direct agent of Logic, we must conclude at once that the Matter of reasoning can be no other than those acts of the intellect which admit of being arranged suitably for the attainment of Truth, *i.e.*, ideas and statements or "judgments;" while the Form of Logic must be that disposition—or handling—of ideas and statements, by means of which the intellect attains its end of knowing Truth. We have already shown that this disposition or handling of ideas and statements, is that internal discourse of the mind which is called reasoning; and hence reasoning must be the Form of Logic.

III. Matter. As intellectual acts are more easily treated of by the use of signs, the word of the intellect or idea is known in Logic as a **Term,** and the complex word or "judgment" as a **Proposition.** Hence **Terms** and **Propositions** are the signs of the

matter of the "Act of the Agent," or of Formal Logic.

IV. Terms. Definition. Taken absolutely, a term is the external sign of what by a simple internal word has become the object of thought: thus fan-tail, tame, wild, virtue, triangle, scalene, isosceles, are terms.

Considered relatively, a term is defined by Aristotle "that into which every proposition[1] is resolved, as into subject and predicate," *e.g.*, our fan-tails—subject—are—interesting birds—predicate. Here the two terms are fan-tails and interesting birds, united by the verb are, which is neither a term nor part of a term, but the nexus or link joining one term to another.

V. Division of Terms. Terms have been divided into a number of classes, of which the following seem to be the chief. [It must be remembered that the various groups of classes, as they may be called, are strictly co-ordinate; and so it will be seen that the same term may often belong to many groups, though it can, of course, belong only to one class or subdivision of each group.]

(1.) Terms may be either **simple** or **complex.** They are simple when they consist only of one word, *e.g.*, man, house, triangle; complex when they consist of two or more words, or even of propositions, *e.g.*, tame fan-tail, bright blue sky, the fan-tails we fed, the house that Jack built.

(2.) A term may be **absolute** or **relative.** An absolute term denotes a thing in itself, *e.g.*, man, book, star; a relative term denotes a thing in rela-

1 See p. 21.

tion to some other thing, *e.g.*, father, master, which denote man in relation to children or subordinates—satellite which denotes a secondary planet in relation to its primary. Terms so related are called **correlatives.**

(3.) Terms may be **abstract** or **concrete**; abstract, when they express a quality or attribute apart from the being of its object, *e.g.*, wisdom, folly, common-sense; concrete, when they express quality united with being, *e.g.*, man, wise, foolish, sensible.

(4.) Terms may be **singular** or **universal**; singular or individual terms are such as can be applied only to a single individual thing, *e.g.*, St. Thomas Aquinas, Aristotle, this ruler, this picture; universal or common terms are such as can be applied in the same sense to many things. Such application may be either:

(a.) **specific**, that which indicates the species of the thing to which it is applied, *e.g.*, the universal term man indicates that John or Thomas, to whom I apply it, is a rational animal.

(b.) **generic**, that which indicates the genus of a thing, or the wider division that is marked into classes by the species, *e.g.*, animal is the genus of man, scansores is the genus of parrot, wind is the genus of monsoon.

(c.) **differential**, that which distinguishes a particular species from all the other species under the same genus, *e.g.*, the universal term rational distinguishes man from all other species under the genus animal, the universal term hyperbolic distinguishes a certain species of orbit from all other species under the genus orbit.

(d.) **proper,** that which indicates something belonging to all the individuals of a species, as such, and applicable only to them, *e.g.*, reasoning is proper to man as such, and belongs only to man.

(e.) **accidental,** that which indicates something which, though not necessarily joined to the difference, is yet found in some individuals of the species, *e.g.*, black as applied to men, green to parrots, white to pigeons, red to roses.

Hence **genus, species, difference, property, accident, are all universals,** because many things do or can participate in them; they are also called **predicables,** because in every proposition that predicate which can be applied in the same sense to many things must be either genus, species, difference, property, or accident.

(5.) Lastly, terms may be **univocal, equivocal,** or **analogous,** which are not really three kinds of terms, but three ways of using them. A term is used **univocally** when it is applied to several objects in the same sense: thus boy is used univocally of John, Henry and James; and girl is used univocally of Edith, Margaret and Alice. A term is taken **equivocally** when it is used in several instances in quite distinct significations: thus the terms Jupiter and Mars are used equivocally of the heathen gods and the planets; and the term Great Eastern is used equivocally of a certain line of railway and a well known steamship. When a term is applied to two or more things in senses which are in some points identical and in some points different, the term is taken **analogically**: thus, according to **analogy of attribution,** which is found between

terms signifying things of different natures, yet all having a connection with some one thing, the term healthful may be applied to medicine, food, exercise, dwelling, and the like; while, according to **analogy of proportion**, which exists when a term is used in two quite distinct senses, standing nevertheless in similar relations to two other terms, we speak of the smile of a man, of fortune, of a meadow, or again of stormy weather, stormy tempers, stormy troubles. Analogy of proportion is what is commonly understood by analogy.

CHAPTER II.

VI. Definition of propositions. VII. Division of propositions. VIII. Properties of propositions.

VI. Propositions. Definition. A proposition is the verbal sign of the statement or, "judgment," or "complex word of the intellect," that is to say, it is the statement or judgment expressed in words, and hence Aristotle calls a proposition an **interpretation**, because it interprets the statement or judgment of the intellect. It may be closely defined as—a sentence in which one term is joined to another, or disjoined from it. The word term is used instead of things, because both terms may express the same thing, and because a proposition does not unite or separate things but the signs of things.

In examining propositions, it will be seen that, although terms and propositions are the matter of formal logic, propositions are the **direct** or **proxi-**

mate matter of reasoning or syllogisms, while terms are the **indirect** or **remote matter**; because, in point of fact, terms are the matter of propositions. They are so because propositions are made of terms formed into propositions by the verb *to be*, which, either explicitly or implicitly, is their nexus or copula, hence makes the proposition what it is, and hence is its **form**; *e.g.*, fan-tails are birds; fan-tails and birds are the two terms of the proposition, *i.e.*, its matter; the verb *are* is the nexus joining the two terms together, and making them into a proposition, *e.g.*, giving the proposition its form. The verb *to be* does this explicitly when it is expressed, as in the above proposition; it does it implicitly when, as in all non-explicit instances, it is implied in the verb used, *e.g.*, The fan-tails fly is logically equivalent to The fan-tails are flying; I came=I was coming; Fan-tails like petting=Fan-tails are liking petting.

VII. Division of Propositions. Like terms, propositions are divided into a number of classes, or co-ordinate group of classes. Of these the following are the chief:

(1.) Propositions may be either **simple** or **composite.** A simple proposition is one which contains only one subject and predicate, and cannot be resolved into other propositions, *e.g.*, This fan-tail is tame,—These colours are bright,—Delays are dangerous. Simple propositions are often called **categorical,** because they simply assert that the subject does, or does not agree with the predicate. A composite proposition is one which either implicitly or explicitly contains other propositions into which it may be resolved, *i.e.*, its subject or predicate

must be compound or composite as opposed to simple. Composite propositions may be:

(a.) **Hypothetical** or **conditional,** when something is affirmed or denied, not absolutely, but under some condition, *e.g.*, if the fan-tails are hungry, they will feed on my hand; If a heavenly body revolves round the sun, that heavenly body cannot be a fixed star; If man thinks, he must be rational. The truth of such propositions depends upon the **assertion** or **consequent** being a result of the **condition** or **antecedent,** hence upon the **nexus** between them.

(b.) **Causal,** when the predicate contains the reason of its union with the subject, *e.g.*, The fan-tails feed on my hand because they are hungry; Man thinks because he is rational; The earth is a planet because it revolves round the sun. The truth of such propositions depends upon the truth of the reason assigned, *e.g.*, the fan-tails might be in the habit of never feeding anywhere else but on my hand, whether they were hungry or not; and then it would not be true to say—the fan-tails feed on my hand because they are hungry, although they might be both hungry and feeding on my hand.

(c.) **Copulative,** when the proposition contains more than one subject, or more than one predicate, made into a single term by some negative or affirmative particle, *e.g.*, Both fan-tails and ringdoves have wings; Neither fan-tails nor ringdoves can fly very high; Plants live and grow; Animals and plants live; the drawing-master has brought some fine copies, both in crayons and water-colours. For these propositions are to be true, the single predicate

must apply to all the subjects, and the single subject must apply to all the predicates.

(d.) **Disjunctive,** when several subjects or predicates are included in a single term by a disjunctive particle, *i.e.*, one which implies an alternative, *e.g.*, I shall either come or go; The sun is either in motion or at rest; The soul is either a simple uncompounded substance, or a composite compounded substance. For such propositions to be true, one of the two or more predicates must apply to the subject; and, in the reverse case, one of the two or more subjects must apply to the predicate.

(2.) Propositions may be **singular, universal, particular,** or **indefinite**: singular, when the subject is a singular term, *e.g.*, Julius Cæsar was murdered in the senate house; The moon is in itself a dark body; Brutus is an honourable man; Thetis saved Hephaistos: universal, when the subject is a universal term, *e.g.*, all men are mortal; all the mythological personages of Homer fall into three groups; all the old Spanish comedies were of a thoroughly romantic character; All Downside boys remember Coxhead Sunday: particular when the predicate is either affirmed or denied of only part of the subject; in such cases the subject is called a particular term, *i.e.*, a universal taken with a limitation; *e.g.*, Some boys are troublesome; Some of the stories in the *Arabian Nights* are probably derived from Persian sources; Much modern philosophy is like a man having a hale and healthy look while the germs of fatal malady lie within him: indefinite, when nothing in the proposition shows whether the subject is used in a particular or in a universal sense,

e.g., Children are bright; Fan-tails are interesting; "The lunatic, the lover, and the poet, are of imagination all compact."

Practically, however, indefinite propositions are treated as universals when they either exclude all exceptions, *i.e.*, have **absolute universality**, *e.g.*, Man is a creature; Fan-tails are birds; or have universality in the **physical** order, *e.g.*, A dead tree cannot put forth green leaves; A dead man cannot return to life (*i.e.*, according to the ordinary laws of nature); —or have universality in the **moral** order, the exceptions to which depend on human freedom, *e.g.*, Mothers love their children; Countries are not liable to foreign invasion from civilized powers in time of peace.

(3.) Propositions may be **affirmative** or **negative;** affirmative when the predicate is affirmed of the subject, *e.g.*, Fan-tails are frolicsome; Man is a free agent;—A strong element of self-assertion is discernible in the Homeric character of Athenè;—negative, when the predicate is denied of the subject, *e.g.*, The fantails are not hungry;—Logicians are not tolerant of words that have no fixed, clear and clean cut meaning;—The portrait of Hubert Herkomer is not in the Grosvenor.

VIII. Properties of Propositions. The principal properties of propositions are (1.) **equivalence,** (2.) **opposition,** (3.) **convertibility.**

(1.) **Equivalence** is the sameness of force and signification existing between various propositions, (a.) They may be equivalent by a simple change of words, *e.g.*, All fan-tails are white, is equivalent to, There is no fan-tail which is not white;—All his

adversaries were crushed by his stinging compressed oration in *Scheriè*, is equivalent to, There was not one of his adversaries who was not crushed by his stinging compressed oration in *Scheriè*.

(**b.**) Propositions may be equivalent because they belong to a whole which can resolve itself into parts, and these parts taken together must be equivalent to the whole: thus, in the above examples, All fan-tails are white—a universal affirmative proposition—is equivalent to the sum of all the singular propositions, This fan-tail is white; and so too, All the adversaries were crushed, equals the sum of all the singulars, This adversary was crushed.

(**2.**) **Opposition** is the contrast or diversity existing between two propositions which have the same subject and the same predicate, and may be a difference either of **quantity**, of **quality**, or of **both combined**. Hence the opposition may be:

(**a.**) **Contradictory**, *i.e.*, both in quality and quantity, or when a universal affirmative proposition is opposed to a particular negative, or a universal negative to a particular affirmative, *e.g.*, All fan-tails are white, of which the contradictory is, Some fan-tails are not white, No fan-tails are black, of which the contradictory is, some fan-tails are black: again, All German critics are of opinion that Hamlet's madness is feigned, has its contradictory in, Some German critics are not of opinion that Hamlet's madness is feigned; and, No sources of polytheism were dried up by the advent of Christianity, has its contradictory in, Some sources of polytheism were dried up by the advent of Christianity.

From this it is clear that, of two contradictories

one must necessarily be true, and the other false; because, if they were both together true or false, we should be affirming and denying something of a thing in the same relation, which would be absurd; and because from the truth of one we infer the falseness of the other, and *vice-versâ*.

(b.) **Contrary,** when the opposition is in the quality of the propositions, and both are universals, *e.g.*, All fan-tails are white, of which the contrary is, No fan-tails are white; again, All planets are round, is contrary to, No planet is round; and No knowledge comes to us through the senses, has its contrary in, All knowledge comes to us through the senses.

Contrary propositions cannot both be true at once, for the same reason given in the case of contradictory propositions; but sometimes both contraries may be false. Thus, the falseness of one may be inferred from the truth of the other; but from the falseness of one the truth of the other may not always be inferred.

(c.) **Sub-contrary,** when the opposition is—as with contraries—in the quality of the propositions, which are not—like contraries—universals, but particular, *e.g.*, Some fan-tails are tame, opposed to, Some fan-tails are not tame; Many little maidens are dumb, opposed to, Many little maidens are not dumb; Many boys are fond of getting "twenty Latin lines," opposed to, Many boys are not fond of getting "twenty Latin lines."

Two sub-contraries may sometimes be true together, *e.g.*, in the example of the fan-tails. Both together, however, can never be false, or

their universal contradictories would both be true, and so two contraries would be true at once, which is impossible. Hence, the truth of one may be at once inferred from the falsity of the other, but not *vice-versâ*, *e.g.*, from the falseness of the propositions, Many little maidens are dumb, and Many boys are fond of getting "twenty Latin lines," which from experimental knowledge I may know to be false, I can at once infer the truth of the opposite propositions, Many little maidens are not dumb, and Many boys are not fond of getting "twenty Latin lines."

(d.) Subalterns differ in quantity only, *e.g.*, Every fan-tail is white, to which corresponds the subalternate, Some fan-tails are white; Every ancient nation believed more or less distinctly in a future state, has for its subalternate; Some ancient nations believed more or less distinctly in a future state.

Subalterns can both together be true or false; hence the truth of one cannot be inferred from the falseness of the other, or *vice-versâ*. But if the universal or subalternant proposition be true, the particular or subalternate proposition must be true also, because it is virtually contained in the universal, as a part is contained in the whole, *e.g.*, "Some fan-tail" is contained in "Every fan-tail," "Some nation" in "Every nation." If, however, the particular subalternate is true, it does not follow that the universal subalternant is true too, for the universal is not comprised in the particular, *e.g.* the particular proposition, Some Carthaginian soldiers were enervated at Capua, is true; but the universal, All Carthaginian soldiers were enervated at Capua, is quite false. On the other hand, if the

particular subalternate is false, the universal subalternate is false, the universal statement must *co ipso* be false likewise, for it stands to reason that what is denied of a part cannot be affirmed of the whole, *e.g.*, the false particular, Some planet is triangular, tells me clearly enough that its universal, Every planet is triangular, cannot be true. Yet, from the falseness of the universal subalternant we cannot infer the falseness of the particular subalternate, for it is possible that what is not true of a whole may be true of a part, *e.g.*, from the false universal. All Carthaginian soldiers were enervated at Capua: we cannot infer that its particular subalternate, Some Carthaginian soldiers were enervated at Capua, is false. Hence, from the truth of the subalternant the truth of the subalternate may be inferred, but not *vice-versâ*; while, on the contrary, from the falseness of the subalternate the falseness of the subalternant may be inferred, but not *vice-versâ*. It will have been seen that the opposition between subaltern propositions is more nominal than real.

(3.) **Convertibility,** is the property by which the subject of a proposition may be converted into the predicate, or the predicate into the subject. More shortly, this conversion is the transposition of the terms of a proposition. The proposition to be converted or transposed, is called convertible or the **convertend**; the new one resulting from the transposition is called the **converse,** *e.g.*, $4=2+2$ is convertible into $2+2=4$.

Conversion may be **(a.) simple,** or **(b.) per accidens.** First of all, it must be noted that in both forms the quality must remain unchanged.

(a.) In **simple** conversion the same quantity is retained as well as the same quality, *e.g.*, No circle is a quadrangle, convertible into, No quadrangle is a circle; No tea-tray is a star-convertible into, No star is a tea-tray. Because, in simple conversion, the two judgments are identical, it follows that either both must be true or both false, and so the truth of one can be inferred from the truth of the other, or the falseness of one from the falseness of the other.

(b.) In Conversion **per accidens** the quantity is changed, *e.g.*, every man is an animal, convertible into, Some animal is man; all Q.C.'s are lawyers, convertible into, Some lawyers are Q.C.'s If, in conversion per accidens, the convertend is true, the converse must be true, *e.g.*, every animal is sentient, converse, something sentient is animal; and, if the converse is false, so too must be the convertend, *e.g.*, something that is irrational is man, converted from, All men are irrational. On the contrary, if the covertend is false, it does not follow that the converse need be false, *e.g.*, All animals are quadrupeds, a false convertend, has a true converse in, some quadrupeds are animals; and, if the converse is true, it cannot be inferred that the convertend is true, as can be seen from the foregoing example. Hence, from the truth of the convertend we can infer the truth of the converse, but not *vice-versâ*; and from the falseness of the converse, the falseness of the convertend, but again not *vice-versâ*.

(4.) It is clear that conversion of propositions implies some process of reasoning capable of being reduced to logical form, *e.g.*, $4=2+2 \therefore 2+2=4$, All planets are heavenly bodies $\therefore$ Some heavenly

bodies are planets; and so we are brought from the **matter** of formal logic to its **form**. Before passing on to it, however, the explanation of the properties of propositions may be simplified by the following table, which is usually given in manuals of logic:

Symbol.	**Proposition.**
A. =	Universal affirmative.
E. =	Universal negative.
I. =	Particular affirmative.
O. =	Particular negative.

Hence

Subalternant A. Contrary E. Subalternant

Subaltern Contradictory Contradictory Subaltern

Subalternate I. Sub-Contrary O. Subalternate

for instance

Every man is rational. Contrary. No man is rational

Subalterns Contradictory Contradictory Subalterns

This man is rational Sub-contrary. This man is not rational

because:

Every man is rational =A.=Universal affirmative.
No man is rational =E.=Universal negative.
This man is rational = I.=Particular affirmative.
This man is not rational=O.=Particular negative.

CHAPTER III.

IX. Form of the act of the agent. X. Definition of the syllogism. XI. Rules of the syllogism.

IX. Form of the "Act of the Agent." In the paragraph on the Division of the "Act of the Agent," it has been shown that the form of the act consists in the internal discourse of the mind which is called reasoning, *i.e.*, in that disposition of ideas and statements, by means of which the intellect attains its end of knowing truth. As the idea, or simple word of the intellect is treated of under the sign **term**, and the statement or "judgment," or complex word of the intellect under the sign **Proposition**; the discourse of the mind or reasoning has for its sign the **syllogism.**

X. Syllogism, Definition. The syllogism is called by Aristotle: "a sentence in which, some things being affirmed, others must necessarily follow from that affirmation." Viewed with relation to its matter, *i.e.*, terms and propositions, the syllogism may be called: a disposition of terms and propositions arranged in such a manner, that from what is known that which is unknown may be deduced. This definition will be found to apply both to deductive and inductive reasoning, and may be stated more simply as: An argument, in which one proposition is gathered or inferred

from two other propositions, by a comparison of the three terms of the argument.

The syllogism then has **three terms** so distributed in three propositions that each one is repeated twice, *e.g.*,

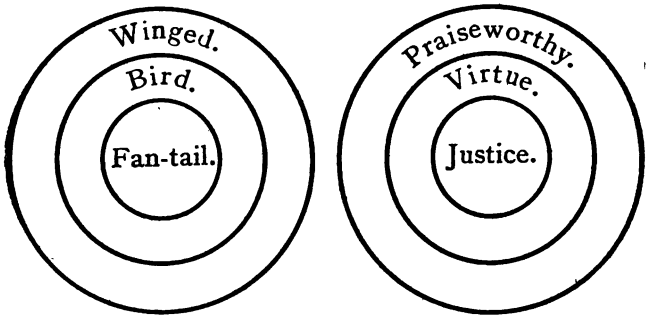
Every bird is winged;
But every fan-tail is a bird:
Therefore every fan-tail is winged.

Again:

All virtue is praiseworthy;
But justice is a virtue;
Therefore justice is praiseworthy.

Of these three terms one is called the comparative or **middle term**, for with it the other two are compared. They are called **extreme terms**; and that one which forms the predicate of the conclusion, or final inferred proposition, is called the greater or **major extreme**, or **major term**; while that which forms the subject of the conclusion is called the **minor extreme** or **minor term**. The reason of their having these names is, that usually in universal affirmative propositions, which, being more perfect than negative ones, supply the names, the predicate has greater extension than the subject, and so the subject has less. As the words are used by logicians, **extension** signifies all the things to which a term applies, while **intension** means the qualities or properties and peculiarities implied in the term, in other words, its definition. Hence the saying that "intension and extension stand in inverse ratios to one another," so that as one increases the other diminishes, *e.g.*, compare ship and steam-ship, pigeon and fan-tail; ship has greater extension than

steam-ship, which has clearly greater intension than ship; and so with pigeon and fan-tail.[1] The remaining term of the syllogism is called the **middle term** because, generally speaking, its extension is less than that of the **major,** and greater than that of the **minor.** To make this clear, we can put our examples into diagram:



Here, winged is the major, fan-tail the minor, and bird the middle term; praiseworthy the major, justice the minor, and virtue the middle term. It is obvious that in these two instances winged and praiseworthy are the terms that have greatest extension, while it is equally evident that fan-tail and justice are the terms with least extension, and so with greatest intension.

The three **propositions** in every syllogism are **(1.)** the **major premiss,** in which the major is compared with the middle term; **(2.)** the **minor premiss,** in which the minor is compared with the middle

[1] See p. 19 for application of universals, and p. 72 *et seq.* for definition.

term; (3.) the **conclusion,** in which the minor is compared with the major term. The two premisses are so called, because they are put forward, or put first, for the purpose of being reasoned about; and they are specified as major and minor because they contain the major and minor terms respectively. The third proposition gathered or deduced from the other two, is called the conclusion, probably because the argument is finished when we have learned what this third or last proposition should be. The whole process can be made clear as follows:

Major Term: Praiseworthy. **Middle Term:** Virtue. **Minor Term:** Justice.	From these terms we form the collateral syllogism.	**Major Premiss:** Every virtue is praiseworthy. **Minor Premiss:** But justice is a virtue. **Conclusion:** Therefore justice is praiseworthy.

Again:

Major Term: Winged. **Middle Term:** Bird. **Minor Term:** Fan-tail.	From these terms we form the collateral syllogism.	**Major Premiss:** Every bird is winged. **Minor Premiss:** But every fan-tail is a bird. **Conclusion:** Therefore every fan-tail has wings.

From what has already been said of the **matter** and **form** of the syllogism, it is evident that a distinction must be made between its **material** and **formal truth.** It is materially true when the propo-

sitions, of which it is formed, are in themselves true: and it is formally true, or correct, if, or rather in so far as its remote matter (terms) are so placed, and its proximate matter (propositions) are so formulated, that the conclusion necessarily follows from the two premisses. Hence an argument or syllogism may be formally true and materially false, and again it may be materially true and formally untrue. But to be perfectly correct or good, it must be both materially and formally true. For instance, the syllogism:

Every beast is irrational;
But man is not a beast:
Therefore man is not irrational,—

is materially true, but formally it is quite untrue or incorrect. From the premisses: Every beast is irrational; but man is not a beast,—I cannot conclude that man is not irrational, for I might draw precisely the same conclusion about a stone, because it is not a beast. On the other hand, the syllogism:

Every substance is material;
But the soul is a substance:
Therefore the soul is material,—

is formally true or correct, but materially untrue because the major premiss is materially untrue.

If the two premisses are materially true, it is obvious that, if the syllogism be formally true, its conclusion must be materially true, because it is **impossible to deduce error from truth.** And, consequently, if the conclusion is materially false, one of the two premisses must be so too, for, unless this were the case, a false conclusion would not be obtained.

Yet, if one of the two premisses is false, it does not necessarily follow that the conclusion will be false. It may be false, it may be true; yet, if true, it is so only per accidens, for its truth is not the result of the argument. And, because in such a case the conclusion can be true per accidens only, it follows that it is so, not in itself, *i.e.*, not as the conclusion, or else the two premisses would be true too, *e.g.*, in the syllogism:

Every virtue is good;
But health is a virtue:
Therefore health is good,—

the conclusion is materially true, and at the same time the minor premiss is materially false. And in the example:

All novels are harmless;
But *Quentin Durward* is a novel:
Therefore *Quentin Durward* is harmless,—

the conclusion is materially true, while the major premiss is materially and most decidedly false. From this general view of the syllogism we pass to

XI. The Laws or Rules according to which the syllogism should be formed, and which concern its **matter** and **form** respectively.

(1.) With regard to the **matter** of syllogisms, the principal rule is that **both premisses should be true,** as has been shown. The extent of that matter is sufficient to prove that the further rules do not come within the scope of purely Formal Logic. We shall meet with them later on in treating of Method and Material Logic.

(2.) The eight rules given by the Scholastics for the **Form** of the Syllogism are based on the two prin-

ciples or canons: (a.) **Dictum de omni, dictum de nullo**=whatever is predicated (*i.e.*, affirmed or denied) of a term taken universally, may be predicated in like manner (*i.e.*, affirmed or denied) of everything contained under it; (b.) **Quæ conveniunt in uno tertio, conveniunt inter se; quæ repugnant in uno tertio, repugnant inter se**=Two things or terms, which agree with one and the same third term, agree with one another; two things or terms, of which one agrees and the other disagrees with one and the same third term, disagree with one another.

Rule I. A syllogism must contain three terms, and not more than three terms; three propositions, and only three propositions. The reason is that syllogising consists in comparing two terms with each other by means of a third term; and, if there were four terms, the argument would consist either of two syllogisms, or of none at all. Suppose the terms to be,—cow, cloven-footed animal, ruminating animal, animal having two stomachs. We may compare the first with the second term, and the third with the fourth; but this will not give a conclusion, unless we have another proposition comparing the second with the third term; and this proposition would give us another syllogism. The reason of the part of rule concerning propositions is that, if there were four propositions, one would be the conclusion, and the other three the premisses; and three premisses will either make no comparison, or they will form two syllogisms. This can easily be made clear by reconsidering the example of the

cows, or the following: oxygen, simple body, carbonic acid gas, compound body.

It is obvious to remark that, whenever any one of the three terms is used in the syllogism, it must have the same sense and the same application; otherwise we should have four terms, *e.g.*, in the syllogism:

All beasts of the earth were created on the sixth day;

But my dog is a beast of the earth:

Therefore my dog was created on the sixth day,—

the middle term, beast of the earth, is applied in the major premiss to the first members of the species, and in the minor to an individual; and thus the syllogism has four terms.

Rule II. There should be nothing in the conclusion which is not in the premisses, *i.e.*, no term should have greater extension in the conclusion than in the premisses. The reason is that what is more universal cannot be contained in what is less universal; and, if the term in the conclusion were taken in a wider meaning than it had in the premisses, it could not in this wider meaning be contained in them, and so could not be drawn from them. Moreover, there would be a fourth term introduced by comparing a part only of the extreme with the middle term, and the whole of it in the conclusion with the other extreme term, *e.g.*:

What I am, you are not;

But I am a man:

Therefore you are not a man,—

where it is clear that man is used in a wider meaning in the conclusion than in the minor premiss.

Again:

All just men are praiseworthy;
But some Greeks are just men:
Therefore all Greeks are praiseworthy.

Here again, the minor term has greater extension in the conclusion than in the minor premiss; and there are really four terms in the syllogism, viz., praiseworthy, just men, Greeks used as a particular term, and Greeks used as a universal term.

Rule III. The middle term must be distributed, *i.e.*, taken universally or in its whole extent of meaning, once at least in the premisses. The reason is that, unless we take the whole of the middle term once, the two premisses may refer to different parts of the middle term, so that there will be no true middle term at all, and in fact there will be four terms, *e.g.*, in the syllogism:

Some animal is endowed with reason;
But the horse is some animal:
Therefore the horse is endowed with reason,—

the middle term, animal, designates the animal that is man in the major premiss, while in the minor it signifies an animal that is a brute, and so in neither case is taken in its full extent of meaning, or universally. And in the syllogism:

Some poet never gives an epithet of colour to a flower;
But Shakespeare is some poet;
Therefore Shakespeare never gives an epithet of colour to a flower,—

the middle term, in the major premiss designates Homer; and in the minor premiss, Shakespeare; and thus is never taken universally.

Rule IV. The middle term must not appear in the conclusion, either wholly or in part. The reason is that the comparison of subject with predicate, by means of the middle term, is made in the premisses; while the conclusion gives the relation between the subject and predicate themselves, *e.g.:*

Alexander was a general;
But Alexander was little;
Therefore Alexander was a little general,—

offends against this rule. So, too, does:

Alice tumbled down the rabbit-hole in her dream;
But Alice was wide-awake;
Therefore Alice, wide-awake, tumbled down the rabbit-hole in her dream.

Rule V. No Conclusion can be drawn from two negative propositions or premisses. The reason is, that the middle term is then one with which extreme disagrees, and not one with which one extreme agrees and the other disagrees, *e.g.*, from the propositions:

Man is not eternal;
But animals are not eternal,—

no conclusion whatever can follow, neither can we draw one from

Mustard is not a mineral;
But charlock is not a mineral.

Rule VI. No Conclusion can be drawn from two particular propositions. The reason is that, if both are affirmative, the middle term in both is taken only in its partial extent of meaning, *i.e.*, would be undistributed, which would be contrary to Rule III.; and, if both propositions are not affir-

mative, either the middle term is again undistributed, or else the major or minor term has greater extension in the conclusion than in the premisses,—and this is contrary to Rule II., *e.g.* (two affirmatives):

Some virtues are pleasing to men;
But some things that are pleasing to men are displeasing to God:
Therefore some things that are displeasing to God are virtues.

This is wrong, because the middle term, pleasing to men, is taken universally in neither premiss. And a like fault is committed in:

Some man is living;
But some man is dead;
Therefore something that is living is dead.

Again (a negative and affirmative):

Some men are brave:
But some soldiers are not brave;
Therefore some soldiers are not men.

Here men is taken universally in the conclusion, but it is a particular term in the major premiss. In like manner;

Some books are hard to understand;
But *Robinson Crusoe* is not hard to understand,
Therefore *Robinson Crusoe* is not a book,—

shows a term (book) used universally in the conclusion, while in the major premiss it is a particular term.

Rule VII. A negative conclusion cannot be drawn from two affirmatives. The reason is, that if both premisses are affirmative, it is evident that both extremes agree with the middle term, whence

it follows that they must consequently agree with one another. For instance, no amount of ingenuity can draw a negative conclusion from the two affirmative propositions:

All quadrilateral figures are contained by four straight lines;

But a rhombus is a quadrilateral figure.

The conclusion can be nothing else but the affirmative:

Therefore a rhombus is contained by four straight lines.

Rule VIII. If one premiss be negative, the conclusion must be negative; and if one premiss be particular, the conclusion must be particular. The reason of the first part of this rule is, that the remaining premiss is affirmative (according to Rule V.), and hence one of the extremes agrees with the middle term, and the other disagrees with it; and therefore the extremes disagree with one another, *i.e.*, the conclusion is negative. The reason of the second part of the rule is that if the conclusion were universal, while one of the premisses was particular, there would be something in the conclusion that is not in the premisses, which would be a violation of Rule II., and involve a violation of Rule I. by introducing a fourth term. The examples already given of the violation of these rules will make this clear. So, too, will the correct syllogisms:

Every just being is deserving of esteem;

But some men are just beings:

Therefore some men are deserving of esteem.

No circles, whose diameters are unequal, can be equal;

But these two circles have unequal diameters:
Therefore these two circles cannot be equal.

In nearly all manuals of Logic, it is shown that if we try in how many different ways we can make syllogisms with the four kinds of propositions,[2] we can get many good kinds of arguments. These are called the **moods or modes of the syllogism,** and they are divided into **four figures,** each figure being known by the position of the middle term in the premisses; whence **figure** may be defined the position of the middle term in relation to the two extreme terms in the premisses, and **mode** the combination of the quantity and quality in the proposition. Logicians have given names to the different kinds of modes; but, as these modes are merely forms in which the rules of the syllogism can be kept, we shall always be able to tell whether a syllogism is correct if we understand its rules well, and so we can for the present pass by the names of the modes, as of no very great practical importance.

[2] See p. 31.

CHAPTER IV.

XII. Divisions of the syllogism.

XII. Divisions of the Syllogism.—Regular or Complete Syllogisms may be either **Simple** or **Compound**; simple, when they are made of simple propositions; compound, when they are made of compound or composite ones.

(1.) **Simple or Categorical** Syllogisms consist of categorical propositions, sometimes called propositions *de inesse*, from their asserting that the predicate is, or is not, contained in the subject. To these Categorical Syllogisms apply *in toto* the eight rules already explained; while the first canon or principle on which they are based, *i.e.*, Dictum de omni, dictum de nullo, applies immediately to the categorical syllogism. To other syllogisms the dictum applies only ultimately, for this application has, as a rule, to be reached and proved by reducing them to categoricals. The examples of syllogisms already given are all categorical. By re-examining two of them, we shall see how the categorical syllogism depends immediately on the first canon, which serves as a basis for Aristotle's eight rules. Thus, in the example:

All virtue is praiseworthy;
But justice is a virtue:
Therefore justice is praiseworthy,—

virtue is related to justice as genus to species, and hence the term, praiseworthy, must, if it applies to virtue, apply also to justice; because, according to the Dictum de omni, what belongs to the genus necessarily belongs to the subordinate species, and what belongs to the species belongs in like manner to the individuals contained in the species; and therefore we cannot deny of the species what we affirm of the genus; nor can we deny of the individual (as member of the species) what we affirm of the species. The following example will illustrate the application to categoricals of the Dictum de nullo:

No planet is a fixed star;
But Uranus is a planet:
Therefore Uranus is not a fixed star.

Here the term planet indicates species, while the term Uranus designates a member of the species: hence the term, fixed star, if denied of planet, must in consequence be denied of Uranus, because what is opposed to the nature of the species must be opposed to the nature of the individuals belonging to the species; and therefore we cannot affirm of the individual what we deny universally of the species, any more than we can affirm of the species what we deny universally of the genus.

This explanation is merely a development of what has already been said[1] of the Dictum de omni, dictum de nullo, which—if looked at more closely—will be seen to be immediately resolvable into the principle that a thing cannot both be and not be at the same time and under the same conditions, *i.e.*,

[1] P. 38.

into the principle of contradiction, which is the first of all principles. For instance, if we affirm that the genus, virtue, is praiseworthy, and deny that the species, justice, is praiseworthy, we are evidently affirming that something belongs, and at the same time does not belong to the genus, which would be impossible. And we also offend against the principle of contradiction, and consequently enunciate an absurdity, if we affirm of the specific nature of Uranus what we deny of the nature of its species, planet; or if we affirm of the species maidenhair fern what we deny universally of the genus, polypodiacea, a particular order or class of ferns.

(2.) **Compound** syllogisms are either (a.) **hypothetical or conditional,** (b.) **copulative or conjunctive,** (c.) **disjunctive.**

(a.) **Hypothetical** or **conditional,** in which the major premiss at least is a hypothetical proposition, *i.e.*, one consisting of two parts, the **antecedent,** containing the little word "if," and the **consequent,** which tells us what will happen under the supposed circumstances. In the major premiss, therefore, the middle and major terms stand to each other in the relation of **condition** and **conditioned**; and the conditional form of the syllogism itself resulting from that relation, is based upon the principle that nothing can either be or not be without a sufficient reason, *i.e.*, upon the principle of sufficient reason, which is one of the fundamental laws of thought, *e.g.*, in the syllogism:

If Matthew is a man, he is mortal
But Matthew is a man:
Therefore Matthew is mortal,—

the principle, that nothing can be without a sufficient reason, clearly enough underlies the argument that leads to the conclusion. According to this principle, it follows that the truth of the thing conditioned can be inferred from the truth of the condition, while the falseness of the condition can be inferred from the falseness of the thing conditioned. Herein we have the basis of the **rules** of the hypothetical syllogism, which are: **If the antecedent be affirmed, the consequent may be affirmed. If the consequent be denied, the antecedent may be denied.** Hence the thing conditioned must be affirmed in the conclusion from the affirmation of the condition in the minor premiss; or the thing conditioned must be denied in the minor premiss, and consequently the condition must be denied in the conclusion, *e.g.:*

If this boy likes story-books with much morbidness in them and little cheeriness, his taste for reading is probably not healthy;
But this boy does like story-books with much morbidness in them and little cheeriness:
Therefore his taste for reading is probably not healthy.

And in the following example we have the condition denied from the denial of the thing conditioned:

If Heyse's theory of friendship be true, his *Stories of Friendship* must be true to life;
But his *Stories of Friendship* are not true to life:
Therefore his theory of friendship is not true.

The connection between the antecedent and the consequent in the hypothetical proposition is called

the **consequence**; and it is entirely upon this consequence that the truth or falsehood of the hypothetical or conditional proposition depends, and not at all upon the truth or falsehood of the antecedent, or of the consequent, or of both of them, *e.g.*:

If the evolutionists are right, man is only a developed ape.

If we cannot conceive what we cannot imagine, we cannot conceive space to be non-existent.

In these examples both the antecedent and consequent are false, yet the conditional composed of them is true, *i.e.*, one is a true consequence from the other. It is obvious that the truth of this conditional is essential to every good hypothetical syllogism.

It is important not to fall into the error of reversing the terms of the two rules stated, *i.e.*, to affirm the consequent, and then infer that we can affirm the antecedent; or to deny the antecedent, and then infer that we can deny the consequent. The reason of this is that the truth of the condition cannot be inferred from the truth of the thing conditioned, nor the falseness of the thing conditioned from the falseness of the condition, because a given effect or result may have many different causes or reasons. Hence, when we affirm the truth of an effect or result, we cannot infer the truth of the cause or reason assigned to it; and, for the same reason, it does not follow that, because the cause or reason assigned is false, the effect *per se* must necessarily be false, *e.g.*, from the major premiss:

If Jenkins has committed forgery, he is liable to be prosecuted,

I cannot argue either that

Jenkins is liable to be prosecuted;
Therefore he has committed forgery;

Or that

Jenkins has not committed forgery;
Therefore he is not liable to be prosecuted,—

because liability to prosecution has many other causes besides forgery. Moreover, in affirming the antecedent from the consequent, it is evident that the third general rule of the syllogism is broken; for the middle term "liable to be prosecuted" is not distributed in either premiss. In like manner, the middle term "man" is undistributed in the following example:

If he is a man, he is an animal;
But he is an animal;
Therefore he is a man.

Again, to deny the antecedent from the denial of the consequent, is to violate the second general rule of the syllogism, *e.g.*, in the instance already given, "liable to be prosecuted" has greater extension in the conclusion than in the major premiss, and so too has the term "man" in the argument:

If he is a philosopher, he is a man;
But he is not a philosopher;
Therefore he is not a man.

(b.) **Copulative** or **Conjunctive**, in which the major premiss is a copulative proposition; strictly speaking, this major should be a negative copulative. The **rules** of this kind of syllogism are: **The copulative or conjunctive proposition must be true. If one of the things conjoined be affirmed in the minor premiss, the other or others are denied in**

the conclusion. The reason is, that a negative copulative asserts that two or more attributes cannot at the same time be predicated of the same subject, yet without affirming that one of them must necessarily be predicated of it, *e.g.:*

The moon cannot at the same time have a fourfold motion and be motionless;
But the moon has a fourfold motion;
Therefore the moon is not motionless.

Here the negative copulative, while asserting the impossibility of the co-existence of rest and fourfold motion, does not affirm that either one or the other must necessarily be predicated of the moon. In this lies the main difference between the copulative and the disjunctive syllogism, of which we shall treat next. For the same reason, the terms of the second rule cannot be reversed, *i.e.*, we cannot deny one of the conjoined things or terms in the minor premiss, and then affirm the rest in the conclusion; because it will generally happen that the enumeration in the copulative proposition is not a complete one, and therefore that something not contained in that enumeration may be predicated of the subject, *e.g.:*

Peter is not at the same time standing and sitting;
But he is standing;
Therefore he is not sitting:—

Or

But he is sitting;
Therefore he is not standing.

But we cannot argue from the same major: he is not standing; therefore he is sitting; for he might

be kneeling, or lying down, or in some other position. Again, from the major:

No man can serve God and mammon,

It does not follow that, because

Many do not serve mammon;

Therefore they serve God,

For they may have given themselves over to the service of some passion other than the love of money. St. Francis Xavier, for instance, before his conversion by St. Ignatius, bid fair to become the slave of love of human glory; and no one will say that it was love of money that held St. Augustine and De Rancé and Father Hermann enthralled before grace triumphed in their hearts. Of course, if the enumeration in the copulative proposition were quite complete, the transposition of the rule would be correct, *e.g.*:

It cannot be at the same time day and night:

But it is not day;

Therefore it is night.

For it must be either one or the other.

Though differing in form from the disjunctive syllogism, the conjunctive syllogism is generally resolvable into it, and always closely allied to it, for both are based alike on the same fundamental law of thought, viz., on what is called the "principle of the excluded third," *i.e.*, that there is no mean between two contradictories; for, if a thing cannot both be and not be at the same time and under the same conditions, it necessarily follows that it must either be or not be. Being and not being absolutely exclude one another: a mean between those extremes is inconceivable. And it is the same with our minds:

they must either affirm or deny what is predicated of the subject: between affirmation and denial there is no mean. For instance, the conjunctive proposition, "No one can at the same time sing and play the flute," leaves no middle course open between affirmation and denial; neither does the disjunctive proposition into which it can be resolved. He either sings or plays the flute, which may be further simplified into,—He either sings or he does not sing; he either plays the flute or he does not play the flute. Thus, as the principle of contradiction is the principle of affirmation and denial, the principle of the excluded third asserts that between affirmation and denial there is no middle course.

(c.) **Disjunctive,** in which the major premiss is a disjunctive proposition, *i.e.*, one which has several terms joined by the word "or," or by some other disjunctive particle, and in which the relation between the major and middle term in the major premiss is one of opposition. As we have seen, the form of the disjunctive is like that of the conjunctive syllogism, determined by the principle of the excluded third, which is the basis of the chief **rule** of the disjunctive sollogism, which is: **If one or more alternatives be denied, the rest may be affirmed.** Hence the disjunctive major must be true, *i.e.*, one, or some of its members must be true, or the disjunction would be false; and there must be opposition between the members: the distribution or enumeration of members must be adequate, *i.e.*, it should include all members that might be enumerated; and no member should include another member. The application of the rule to syllogisms

in which the disjunctive major has only two members, is that one member will be denied in the minor premiss, and the other affirmed in the conclusion. In syllogisms, in which the disjunctive major premiss has more than two members, and only one is denied in the minor premiss, the rest will be affirmed in the conclusion, which thus becomes a copulative or conjunctive proposition. As instances of these two applications, we may take:

The sun either moves or is stationary;
But it is not stationary;
Therefore it moves.

Titian's "Noli me tangere" is either in the Manfrini Palace, Venice, or in the National Gallery; But it is not in the Manfrini Palace, Venice;
Therefore it is in the National Gallery.

A known planet must either be Mercury, or Venus, or the Earth, or Mars, or Jupiter, or Saturn, or Uranus, or Neptune, or one of the planetoids.
But it is not one of the planetoids; Therefore it must be either Mercury, or Venus, or the Earth, or Mars, or Jupiter, or Saturn, or Uranus, or Neptune.

This four-sided figure must be either a square, an oblong, a rhombus, a rhomboid, or a trapezium;
But it is neither a square nor an oblong;
Therefore it must be either a rhombus, a rhomboid, or a trapezium.

It is sometimes said that the terms of the rule of the disjunctive syllogism may be reversed, and so

that: **If one or more alternatives be affirmed, the rest may be denied**; hence that when the minor premiss affirms one or more members, the rest will be denied in the conclusion. This must necessarily be the case where there are only two members or alternatives in the major premiss: but it is possible, when there are many members in the major premiss, that we may affirm one in the minor, and yet not be able to deny the rest in the conclusion, *e.g.*, a magistrate is either a justice of the peace, or a mayor, or a stipendiary magistrate; but it does not follow that one who is a justice of the peace is not a mayor. Yet it is obvious that the disjunction is true, and the enumeration adequate in the example given. So is it likewise when we say, Tilly was defeated either at Wimpfen, or Höchst, or Lutter, or Breitenfeld, or the Lech, or some other battle in which he commanded; but we cannot conclude that because he was defeated at Breitenfeld, he was not defeated in any other battle, for Gustavus Adolphus gained the day at the battle of the Lech. We see then that we can only rightly affirm one alternative, and then deny the others, if there be such a difference between them that they could not be true at the same time, *e.g.*, if I am examining the planet Jupiter through a telescope, and I see his moon Ganymede, I can say,—Because this moon is Ganymede, it can be neither Io, Europa, nor Callisto. Or I am examining a class of seven small boys; a bright little fellow attracts my attention; I look at the class-list and see that this boy must be either Sinbad, or Selim, or Aladdin, or Crusoe, or Merton, or Alfgar, or Tempeston; the teacher at my side whispers

that it is Alfgar, thus supplying a minor premiss; whereupon, supposing the enumeration in my major, the class-list, to be adequate, I am quite justified in concluding that my young examinee is neither Sinbad, nor Selim, nor Aladdin, nor Crusoe, nor Merton, nor Tempeston.

From what has been said of the disjunctive syllogism, it is clear that it does not obey all the general rules of the syllogism, *e.g.*, in our last examples a negative conclusion is drawn from two affirmatives, which is contrary to Rule VII.; and, in the first examples of the disjunctive syllogism, an affirmative conclusion follows from premisses, of of which one is negative, which is against Rule VIII. This rule is also broken in conjunctive or copulative syllogisms when their conclusion is affirmative:[5]

(3.) The general **rule for testing the validity of compound,** *i.e.*, hypothetical, conjunctive, and disjunctive **syllogisms,** is **to reduce them to the simple** or categorical syllogism, which is the means of applying to them the *Dictum de omni, dictum de nullo,* to which they must be conformed if they are valid, or have a true illation, and which, as we have seen, applies immediately to all categorical syllogisms. This reduction need not usually be difficult; for the two extreme terms are found in the conclusion, and the middle term is seen in the premiss. When we have our three terms, we can readily form them into a categorical syllogism, *e.g.*, the hypothetical:

If God is just, He will reward virtue;
But He is just;
Therefore He will reward virtue;

5 See xii. 2. b.

can be reduced to the categorical:

A just being will reward virtue;
But God is a just being;
Therefore God will reward virtue.

CHAPTER V.

XIII. Incomplete and extended syllogisms.

XIII. Incomplete and **Extended Syllogisms.** So far we have been considering complete Syllogisms, *i.e.*, those which are stated at full length, and end with the conclusion drawn from two premisses. But, usually speaking, only one premiss is stated, and a reader can without difficulty judge, from its union with the conclusion, what the suppressed premiss should be. Such syllogisms are called **Incomplete.** Again it often happens that a conclusion is not reached by one syllogism, but by a series of syllogisms, each of which is in some way dependent on the one going before it; and these syllogisms are known as **Extended.** By some logicians those two classes of syllogisms are called "forms of argument akin to the syllogism," as they are not in strict syllogistic form.

(1.) Under **Incomplete Syllogisms** we have—

(a.) The **Enthymeme,** in which one of the two premisses is suppressed, but the conclusion is introduced by "therefore," "hence," or some equivalent word. Thus we may call the Enthymeme an argument in which the conclusion is deduced imme-

diately from one of the premisses without a formal syllogism, *e.g.*,

The human soul is spiritual;
Therefore it is immortal.

Here the major premiss, what is spiritual is immortal, is evidently understood. And, in arguing that

The radii of the same circle are equal to one another,
Therefore these lines are equal to one another,

the conclusion is at once deduced from the major premiss, the minor, These lines are radii of the same circle, being suppressed.

(b) The **Contracted Syllogism,**—which is really a causal proposition,[1]—in which one premiss is suppressed, and the other is united to the conclusion by "because," "since," "for," or some equivalent word, *e.g.* Man thinks because he is rational, is a contraction of the syllogism:

Rational beings think;
Man is a rational being;
Therefore man thinks.

And, when we say, The thermometer is below 32° Fahrenheit because it is freezing, we are reasoning from the suppressed major premiss, whenever it freezes the thermometer is at or below 32° Fahrenheit.

(2.) The **Extended Syllogism** may be either a

(a.) **Polysyllogism,** in which two or more complete syllogisms are so united in a series that the conclusion of one forms a premiss (usually the first premiss) of that one which follows it, *e.g.*, the complete syllogisms,

[1] See p. 23.

1. An infinitely perfect being is infinitely just;
   But God is an infinitely perfect Being;
   Therefore God is infinitely just.
2. He who is infinitely just, punishes evil;
   But God is infinitely just;
   Therefore God punishes evil.
3. God punishes evil;
   But calumny is evil;
   Therefore God punishes calumny.

May be thrown into a polysyllogism thus:

Major. An infinitely perfect being is infinitely just;

Minor. But God is an infinitely perfect Being;

Conclu. of 1, *and Minor of* 2. Therefore God is infinitely just.

Major. He who is infinitely just punishes evil:

Conclu. of 2, *and Minor of* 3. Therefore God punishes evil.

Major. But calumny is evil;

Conclu. Therefore God punishes calumny.

The polysyllogism is generally used either when the train of reasoning is evident, or to shorten a prolix argument. When the single syllogism constituting the series are all of the same kind (*i.e.*, when they are all categorical, or all hypothetical), we have a "pure" polysyllogism; otherwise the polysyllogism is known in contradistinction, as "mixed." The syllogistic series, out of which an actual polysyllogism may be formed, or into which it may be resolved, is sometimes called the "perfect polysyllogism," because it is in perfect syllogistic form; while the polysyllogism formed from it is designated a "contracted polysyllogism," because in each link of the

argument one premiss is really suppressed. This may be illustrated by the following syllogistic series and the polysyllogism to which it is reduced:

1. That which is composed of parts is limited;
   But matter is composed of parts;
   Therefore matter is limited.
2. That which is limited is subject to change;
   But matter is limited;
   Therefore matter is subject to change.
3. That which is subject to change supposes succession;
   But matter is subject to change;
   Therefore matter supposes succession.
4. That which supposes succession must have had a beginning;
   But matter supposes succession;
   Therefore matter must have had a beginning.
5. That which must have had a beginning cannot be eternal;
   But matter must have had a beginning;
   Therefore matter cannot be eternal.

From this we get the polysyllogism.

Major. That which is composed of parts is limited;

Minor. But matter is composed of parts;

Conclu. of 1, *and Minor of* 2. Therefore matter is limited.

Major. That which is limited is subject to change;

Conclu. of 2, *and Minor of* 3. Therefore matter is subject to change.

Major. That which is subject to change, supposes succession;

Conclu. of 3, *and Minor of* 4. Therefore matter supposes succession.

Major. That which supposes succession must have had a beginning:

Conclu. of 4, *and Minor of* 5. Therefore matter must have had a beginning.

Major. That which must have had a beginning, cannot be eternal;

Conclu. Therefore matter cannot be eternal.

(b.) **Epichirema,** where the reason of the union of the subject and predicate is indicated in one or both of the premisses. Such a premiss thus becomes a causal proposition or contracted syllogism, and hence the Epichirema may be resolved into as many syllogisms as it contains causal propositions *plus* the main syllogism, *e.g.*,

Every spiritual being is incorruptible, because it has no parts and does not depend on matter;
But the human soul is a spiritual being, for if it were not so, it would be incapable of thought;
Hence the human soul is incorruptible.

It is obvious that this example is resolvable into many syllogisms. First, we take the main argument:

Every spiritual being is incorruptible;
But the human soul is a spiritual being;
Therefore the human soul is incorruptible.

In proof of the major we have—

That which has no parts is incorruptible;
But all spiritual beings have no parts;
Therefore all spiritual beings are incorruptible.
That which does not depend on matter is incorruptible;

But spiritual beings do not depend on matter;
Therefore spiritual beings are incorruptible.

And in proof of the minor—

If the human soul is capable of thought, it must be a spiritual being;
But the human soul is capable of thought;
Therefore the human soul must be a spiritual being.

This may be reduced to a categorical by changing the major premiss into—

Whatever is capable of thought, must be a spiritual being.

It must now be clear that the Epichirema is not a single argument, but a combination of many arguments. It is generally used in elucidating obscure questions, or in addressing readers or hearers who are known to be opposed to the conclusion.

(c.) **Sorites,** in which the predicate of the first proposition is the subject of the second; the predicate of the second, the subject of the third; and so on till the conclusion, which is formed of the subject of the first and the predicate of the last. Hence there will be as many syllogisms in the sorites as there are propositions between the first premiss and the conclusion, which is reached through a series of major premisses, the first premiss being the only minor expressed in the sorites. Thus, no proposition except the first should be particular; and if that be particular, the conclusion must be so also; and no proposition except the last may be negative, and then the conclusion will be negative, *e.g.*,

God is a necessary Being;
A necessary being is a perfect being;
A perfect being is an omnipotent being;
An omnipotent being can do all things;
Therefore God can do all things.

Here we have three syllogisms formed of the—

Major Term: Do all things;
Middle Terms: { A necessary being; A perfect being; An omnipotent being;
Minor Term: God.

And the sorites formed from them differs from the polysyllogism only in the suppression of the immediate conclusions, which thus must in the sorites, as in the polysyllogism, form one of the premisses of the next syllogism. Should they not do so, the sorites will be formally false; and hence its formal truth may be proved by reducing it to a series of simple syllogisms. Its material truth will be destroyed, or at all events injured, by introducing into the series of major premisses either false or ambiguous terms; for this would be either to break or to weaken the chain of the argument, and, by rendering the conclusion unwarrantable, to destroy its value.

The sorites may be either categorical, *i.e.*, formed of categorical propositions, as in the example given; or hypothetical, *i.e.*, formed by hypothetical propositions, *e.g.*,

If Timour is a man, he is a rational animal;
If he is a rational animal, he is a sensitive living being;
If he is a sensitive living being, he is an animate body;

If he is an animate body, he is a composite substance;

Therefore, if Timour is a man, he is a composite substance.

Or else: Therefore, if he is not a composite substance, he is not a man.

Or else: But Timour is a man;

Therefore he is a composite substance.

This last way of putting the conclusion shows that in the hypothetises sorites, the minor premiss may sometimes immediately precede the conclusion, instead of heading the series of propositions.

(d.) **Dilemma** (or **Trilemma, Tetralemma,** &c., according to the number of its disjunctive members), in which the major premiss is a disjunctive proposition, from each member of which the same consequent is drawn hypothetically in the hypothetical minor premiss (which thus has as many members as there are parts in the disjunction), while the conclusion infers categorically the truth of the common consequent. In other words, the disjunctive major is formed of members opposed to one another in such a manner, that, if one be admitted, the proposition under proof, must be established, *e.g.*, Tertullian says in his *Apology:*

The command of the Emperor, that the Christians are not to be sought out, and that only those are to be punished who are denounced as such, is unjust; because—

The Christians are either guilty or they are innocent;

If they are guilty, the command is unjust, because if guilty they ought to be denounced;

If they are innocent the command is unjust, because if innocent they ought not to be punished;

Therefore, whether the Christians are innocent or guilty, still the command is unjust.

Again, if some presumptuous speculator, calling in question the judgment of the Most High, were to ask, Who on earth knows what becomes of the Malays or Hindoos after death? we may propose to him the unanswerable dilemma:

If, on the one hand, those poor people cannot help breaking the Ten Commandments, as some persons say they cannot, for want of better knowledge, then, depend upon it, they do not go to Hell;

If, on the other hand, they do go to Hell, they go there for doing that which they well knew was wicked, and which they well were able to refrain from doing;

Either way, the justice of the Most High is above reproach.

Such arguments are often called "horned syllogisms," because if any member of the disjunction be admitted, whoever denies the conclusion must be beaten: hence the expression "choosing between the horns of a dilemma."

In all these arguments it is necessary—

(α.) that the disjunction in the major premiss should be adequate or complete;

(β.) that the consequence in the minor premiss should be true, and a necessary conclusion from the disjunction;

(γ.) that the dilemma or conclusion cannot be turned against the arguer by an adversary.

Against the first and second of these rules, Socrates errs when he says:

In death, sensation is entirely lost, as in sleep, or the soul passes to a happier land;
If the first is the case, I shall calmly repose;
If the second is the case, how much more happily shall I live with Orpheus, Ulysses, and all the other celebrities;
Hence in either case it would be expedient or better to die; and therefore, whether sensation is lost as in sleep, or the soul passes to a happier land, it is still expedient or better to die.

Here the disjunction is obviously incomplete, for the possibility of eternal misery is unmentioned; and the consequence drawn is not a necessary one.

Against the third rule the mother offended, who thus urged her son not to undertake any office in the State:

Either you will fulfil it ill, or you will fulfil it well;
If well, you will displease men;
If ill, you will displease God;
Therefore, whether you fulfil it well or ill, you will always displease someone.

To this the son readily retorted:

I shall fulfil the office either ill, or well;
If well, I shall please God;
If ill, I shall please men;
Therefore, whether I fulfil it well or ill, I shall always please someone.

Like every other form of the extended syllogism, the dilemma is really a compendium of syllogisms, of which it contains at least as many as there are members in the disjunctive major premiss. It has sometimes been called the deadly weapon of reasoning; for, when all other arguments fail to convince, a good dilemma being unanswerable, must necessarily at all events close the discussion. To prove whether or not a dilemma is good, we have only to resolve it into its component syllogisms; *e.g.*, suppose that a Frenchman, taken prisoner in China, were offered his life and liberty on the condition that he passed satisfactorily an examination in Chinese theology, after two days' study of an appointed text-book in solitary confinement, he would probably resign himself to failure and captivity, in face of some such argument as the following dilemma, or rather trilemma:

The questions will be set in Chinese theology, either from the text, or from some other book, or from some source of traditional information;

If they are set from the text I shall fail, because I can no more understand the text than I can understand the language of the Potowatomies;

If they are set from some other book, I shall fail, because I know no more of Chinese theology than I have read in the text which I cannot understand;

If they are set from some source of traditional information, I shall fail, because I do not know a single Chinese tradition.

Therefore, whether they are set from the text, or from some other book, or from some source of traditional information, still I shall fail.

This example may be reduced to many simple syllogisms. To begin with the simplest:

The questions will be set in Chinese theology;

I cannot answer what will be set in Chinese theology;

Therefore I cannot answer the questions; in other words, I shall fail.

Upon this we can build three more simple syllogisms, according to the number of members in the disjunction. But each member of the hypothetical minor premiss consists of a causal proposition, or contracted syllogism; and, by expanding each of these, we get three more *bonâ fide* syllogisms: so that our dilemma is reducible to at least seven distinct syllogisms.

CHAPTER VI.

XIV. The act of the agent in relation to its end. XV. Method. XVI. Division of method.

XIV. So far, in considering the "act of the agent" of logic, we have been concerned with the laws on which depends the formal truth, or accuracy of thought, considered purely in itself as thought, *i.e.*, with logical truth, which consists in the correspondence between the thought and the formal laws of thought." But as the end of reasoning, and therefore of logic, consists in the material truth of thought and in the attainment of certainty, we must next look at the order which should be followed if we would attain this end, or—as we may put it—at the necessary link between the act of the agent and the end of that act, or at the act of the agent in relation to its end. This is done in what is called method, and its right to a prominent place in logic can very soon be vindicated. We have seen that Suarez calls it "the proper office of logic to give the means of acquiring true science." Now the means of acquiring true science can be nothing else than the way that leads to it, and in that way, as in every other, there is a starting point, a road to be followed, and a destination. The starting-point is our own mind, or more immediately those mental processes we have been

examining as "the act of the agent;" the road to be followed, if we would reach the destination we have in view, is method; and the necessity of method bears, consequently, an exact proportion to the necessity of its end.

XV. Method then may be defined: the order or process which should be followed by the mind in order to attain its proposed end, *i.e.*, certainty and truth. Hence, in method thought is no longer considered purely for its own sake, but in its relation to objective truth, though we have not yet to do with the matter of the thought which corresponds to the objective truth. Besides telling us the order to be observed by the mind in seeking truth, method likewise teaches us the laws on which the formal accuracy of this order depends in each of its divisions.

XVI. Division of method. In investigating an objective truth, and making it cognizable to the intellect, three things are necessary:

(1.) We must ascertain what the thing really is, which forms the subject of our inquiry; and this is done by **Definition:**

(2.) We must distinguish the parts which constitute the whole of the thing; and in this we have the work of **Division:**

(3.) We have to establish the truth of our assertion by proofs, *i.e.*, to verify or prove the objective truth of the subject of our enquiry; and here we have the function of **Argument,** or more closely of **Demonstration.** It is needless to explain how these three processes correspond to their signs, which we have been studying as the matter and

form of Formal logic, and to the mental processes of which those signs are an interpretation.

(4.) Lastly, Methods treat of **Science** or **Knowledge,** or—more exactly—**Scientific Knowledge,** as the outcome or result of Definition, Division, and Argument or Demonstration, which three processes will be found to comprise the whole operation of the mind in its investigation of truth. Then, as objective truth in its totality is not merely a conglomeration of many separate truths, but as all objective truths form together one inter-connected, comprehensive whole, the mind does not stop at the acquirement of particular truths piecemeal, so to say, but passes on to combine them into a higher or scientific whole; and so method has to deal with the order which should be followed in this combination. Besides all this, it has to determine the laws or rules upon which depends the formal accuracy of this fourfold process. Thus, in the means between the "act of the agent" and its end, we have to consider Definition, Division, Argument or Demonstration, and scientific knowledge as such.

CHAPTER 7.

XVII. Definition. XVIII. Rules for definition.

XVII. Definition. To define is, according to its derivation, to circumscribe within limits; and so, to define a thing is to circumscribe it within limits in such a manner that it may stand out clearly and distinctly from all other things; whence definition may be called a clear exposition or explanation of that which is the subject of investigation, or a precise statement of the qualities which are just sufficient to mark out a thing or class. Exposition or explanation may be taken as a sort of generic term including the various kinds of definition, which all fall within its extension, while severally exceeding it in intension. Now, we can explain either words or things, and thus definition is primarily either nominal or real.

(1.) **Nominal,** *i.e.*, of words, of which it explains (a) either the etymology or derivation, *e.g.*, philosophy=love of wisdom, method=way following after, sorites=heaped up; (b) or the ordinary use in common parlance, *e.g.*, by the name sun we understand the star which is the centre of our system, and regulates our days and seasons, by the name winter we understand the coldest months of the year; (c) or the use in particular cases, *e.g.*, *Mercury* as the name of some particular vessel, the

Spectator as the name of a leading literary paper, *Vice-versâ* the name of Anstey's famous story.

(2.) **Real,** *i.e.*, a definition which explains, not the word, but the thing itself implied by the word, and which shows what the thing is in answer to the question, What is it? thus clearly distinguishing it from all things else. A real definition may be either descriptive, genetic, or essential.

(a) **Descriptive,** *i.e*, one which answers the question **quid sit** by painting a clear picture of the thing, and distinguishes it from all others by explaining or depicting its qualities whether proper or accidental, but does not penetrate to and show its essence, *e.g.*, man is a civil, political, religious animal endowed with speech; James is a strong, tall, dark-haired, athletic-looking fellow; in *Troilus and Cressida* Shakespeare thus paints for us the youth of Greece, "The Grecian youths are full of quality; they're loving, well composed, with gifts of nature flowing, and swelling o'er with arts and exercise;" and Virgil gives the following descriptive definition of Polyphemus:

Monstrum horrendum, informe, ingens, cui lumen ademptum,
Trunca manum pinus regit, et vestigia firmat.

Clearly enough, these are no definitions, properly so called; they do not go beyond description; but of things whose essence is either not known or has not yet been formulated, description is all that we can give, and in other cases it prepares the way for exact definition. Descriptive is often called Physical Definition because the definitions of Physical Science do not generally express the essence,

but are a synthesis of the accidents which are properties of a class. Such, for instance, would be to define sodium as a silver-white metal, soft at ordinary temperatures, melting at 95·6°, volatilizing, and yielding a colourless vapour below a red heat; its combining weight being 23, and its specific gravity 0·97; or to call liquefaction, the passage from a solid to a liquid state; and sublimation, the conversion of a solid into a gas.

(b.) **Genetic,** *i.e.*, a definition which explains a thing by describing its origin, or the way it is produced, or how it is formed from its components, *e.g.*, an eclipse of the moon is occasioned by the earth passing between the sun and the moon; a circle is made by drawing from a given point a circumscribing line, each part of which is at precisely the same distance from the given point; manganese monoxide is a greenish powder obtained by heating the carbonate in absence of air. Though not strictly speaking definitions, because they do not show the essence of the thing, these genetic definitions have nevertheless a better claim to the title than have those of the simply descriptive class, inasmuch as they usually show more clearly what the thing is, and distinguish it from all things else, and sometimes directly lead up to essential definition.

(a.) **Essential,** *i.e.*, a definition which explains a thing by showing what are the principles that constitute its essence; whence it may be defined, an exposition of the constituents of the essence of the thing. This is *bonâ-fide* definition; for by giving the essence, *i.e.*, "that which makes the thing what it is," it answers the question *quid sit* in the

only satisfactory way possible. Hence, an essential definition is the only kind of real definition, in the strict or exact sense of the term. But the essence of the thing is comprehended in the idea or concept representative of it; and therefore from a subjective point of view essential definition may be called conceptual definition, or an exposition of the essential matter of the idea or concept. The reason is obvious. Such a definition expresses in the first instance the essential constituents which form the concept, and consequently formulates *eo ipso* the essence of the thing represented by the concept.

It may be useful to note parenthetically that, as the same object may be viewed under various subjective aspects, two or more essential definitions of the same thing may be equally good, yet not identical in form. For instance, from a metaphysical point of view in which my definition is a synthesis of the matter and form of the object, I should define man as a being formed of an organic body and an intellectual soul; the body being the matter, *i.e.*, that element which is in itself indeterminate but is capable of receiving determination from another, and the soul being the form, *i.e.*, that which determines the indeterminate matter, or in other words makes it what it is. From a logical point of view, in which my definition is a synthesis of the genus and differentia which constitute the species, I should define man as a rational animal, or still more logically as an animal rational. Both these definitions are an exposition of the essence of the thing represented by the concept. The difference between them lies

in this, that the metaphysical definition regards the constituents of the essence, *i.e.*, soul and body, as possibly separable, though actually inseparable; whereas in the logical definition the constituents of the essence, *i.e.*, the animal and rational elements are separable only in thought and not in fact, because the intellectual soul is the principle of both.

Now, as every logical definition expresses the components of the concept, and as these components consist of the genus and differentia constituting the species of the object, it is clear that the essential components of every logical definition must be the proximate genus and ultimate differentia of the matter of definition, and nothing else. The *proximate* genus, be it remembered, not any genus higher up in the scale. To define man, for instance, as a rational substance, or a bear as a plantigrade body, would not be to express the essence, and so would not be an essential definition, though cases of this kind might sometimes pass for description. But, by showing what the thing defined has in common with some other things, viz., its proximate genus, which implicitly contains every superior genus up to the *genus supremum*, and what differentiates it, viz., the species, an essential definition forms a sort of compendium of all the knowledge that can be gained concerning the thing as such.

Although every essential definition is really the last link in a chain of definitions, inasmuch as we can mount up through the definition of a series of generic terms to the *genus supremum*, yet the fact of there being a *genus supremum* shows that we cannot

go on defining by genus and species *in infinitum.* Why? Because the defining term in every defining proposition, *i.e.*, the predicate expressing the proximate genus and differentia, is representative of a composite concept corresponding to the composite essence of the thing defined. But, ascending in the scale of genera, we come at last to a genus which includes all the sub-genera, and cannot itself be differentiated. This is the *genus supremum;* and, if it cannot be differentiated, the concept corresponding to it cannot be composite; if not composite it must be simple; and hence the simple concept must be the limit of logical definition. For instance, if I define man as a rational animal, animal as a sensitive living being, living being as an animate body, body as a composite substance, I am stayed from further definition by my simple concept of substance, *i.e.*, being which exists in itself, as opposed to accident, *i.e.*, being which necessarily inheres in some other. These two genera, substance and accident, divide all being, which as transcendental includes and goes beyond or transcends everything. Hence, of being, substance and accident, and of some other things which do not enter into the province of logic, it is impossible to give any definition; but it need hardly be said that they can be to some extent explained and described; while no one will question that explanation of the indefinable is immeasurably more difficult than definition of the composite.

As definition is limited from above by substance and accident as all-embracing genera, so is it limited from below by individuals and single instances of

fact. Again, why? Because the concept representative of the species must be universal; if universal, it can be applied to many things; if applicable to many things, it cannot be confined to any one thing. Further, the species cannot become a subgenus when the concept excludes the addition of any determining differentia, as, *e.g.*, in man: a *Zulu*, is a rational animal, so is an Englishman; different as they are, the difference is not essential: so in that category it is evident that definition cannot take cognizance of individuals. Here, however, description comes in to perfect the work of definition, and to distinguish the objects of definition by depicting their properties and accidents, *e.g.*, the battles of Cannae, Platea, and Waterloo were all alike in being battles; but, waiving for the moment the question of causes and effects, description will tell us how they differed.

XVIII. Rules which ensure the **formal accuracy of definitions.** A definition should be:

(1.) **Adequate and exclusive**; in other words, it must include all, and only, those objects which it can define: hence it should be neither more nor less comprehensive than the thing defined, *e.g.*, to define Logic as "the science of the laws of formal thought," would be an insufficient definition, for it would not include the whole of Logic; and to define meteorology as the science of storms would be to exclude many of the most important things taught by meteorology. On the other hand, to define planet as a heavenly body, would be to give too wide a definition, for there are other heavenly bodies besides planets; and a like fault would be committed

in defining fortitude as a good quality, for good is far from the ultimate differentia.

(2.) **A thing must not be defined by its own name,** nor by any word **derived from or equivalent** to its name. This would be to induce a vicious circle, of which more anon. Logic, for instance, must not be called "the science of the laws of Logic, or of logical laws;" nor can arithmetic be defined as "the science of arithmetical processes."

(3.) A definition must be **clearer than the thing defined.** Otherwise it would not answer its end, which is the elucidation of the thing. Hence we should not in definitions make use of obscure, double meaning, or merely metaphorical expressions, *e.g.*, when Burke calls law "beneficence acting by rule," he uses a very true metaphorical expression, but we must not mistake it for a definition; and the same may be said of the well known aphorism of Novalis, that "character is a completely fashioned will."

The quality of clearness is, however, relative, for we cannot expect philosophical definitions to be self-evident to uneducated minds; and it would be a mistake to reject good definitions because they are not apparently easy of comprehension, and to fix instead upon others which, though possessing a fallacious clearness, are neither philosophical nor true.

(4.) A definition **should not be negative.** For a merely negative definition does not explain what the thing is, but what it is not; and hence must always have greater extension than the thing defined, *e.g.*, we cannot define man by saying he is not a pure spirit, for many things besides man are not pure spirits;

nor can we define a beast by saying that it is not a rational animal, for this is true of all things excepting man. Only when its contrary has been positively defined, or when we are leading up to such definition, may we define a thing negatively; and the negative definition has merely this value, either that by its means the way is prepared for positive definition, or that the positive definition is more strikingly told out. As an instance we may name the passage in Cardinal Newman's *University Lectures*, where he answers his own question, "What is Theology?" by saying "what it is not," before passing on to tell us "what it is." Thus, too, after defining "compound or composite," as that which is formed of parts, I can at once define "simple" as that which is not formed of parts.

(5.) A definition should **be short and exact, or distinct**; it should avoid prolixity, and express the genus and species in as few words as possible, as far as this can be done without detriment to its distinctness. Definitions formulated in long involved sentences should always be avoided; it will usually be found that inexactitude, obscurity, and prolixity involve violations of rules other than that which draws attention to distinctness and precision.

CHAPTER VIII.

XIX. Division. XX. Rules for division.

XIX. Division, as its name implies, is the distribution of a whole into its various actual or conceivable parts, regarded from a given point of view. It is, as we have seen, presupposed in every definition, as the necessary analysis preceding synthesis; and its value has been strikingly estimated by Plato, who says,[1] "If I were to meet with a leader who knew how to divide rightly; I would follow his footsteps as those of a God." In every division, then, we have (1.) **a whole to be divided,** (2.) a given point of view from which the whole is considered in its division, *i.e.*, **a ground or basis for the division,** (3.) parts into which the whole is divided, *i.e.*, **members of the division.**

(1.) **The whole** to be divided may be either actual, potential, or moral.

(a.) **actual,** *i.e.*, one whose component parts form its substance or nature; man, *e.g.*, is an actual whole as composed of body and soul, which are the components of his nature. Partition is the name usually given to the division of an actual whole; it may be either physical, metaphysical, or logical. A whole is called **physical** when its parts are separable, as are, for instance, body and soul;

[1] *In Phæd.*

metaphysical, when the parts are really distinct, yet not separable, *e.g.*, the soul of man which possesses powers and faculties really distinct from each other, but inseparable either from the soul or from each other; **logical** when a thought, which is a simple act, is the matter of analysis, *e.g.*, a statement or judgment as composed of its matter and form, *i.e.*, two terms and a copula; or a composite concept, or the subject of a discourse or treatise. As thought is a simple act and therefore indivisible, we do not, of course, in a logical whole, attempt to regard "parts" of thought, but the signs by means of which we reflect upon our thought, and which our minds apprehend as its "parts," in order to make such reflection possible. In other words, we think of thought, which is itself simple, as composite because, if we go below the most surfacial of surfaces, we cannot in our present imperfect state conceive of a simple whole. In Heaven all this will be very different.

(b.) **potential,** *i.e.*, a whole whose parts are not the components of its substance or nature, but of its extension; and so are comprised in the whole, not actually but potentially. Every universal term is therefore a potential whole, in so far as it comprises as a whole a number of members, to which it can be applied. Thus every genus is a potential whole with regard to its species, and every species with respect to the individuals comprised under it; *e.g.*, animal is a potential whole comprising man, beasts, birds, fishes, &c. The division of potential wholes is division in the exact sense of the term, in contradistinction to partition and distribution, and is

formed according to the parts of the extension.

(c.) **moral,** *i.e.*, a whole whose component parts are independent beings formed by some external principle into a collective unity, or rather union, *e.g.*, an army is a moral whole, for though the soldiers are united as members of one body, this union has only a collective character. As distinguished from the partition of actual, and the division of potential wholes, the division of moral wholes is termed distribution. The division of an army into brigades, regiments, battalions, &c., is a distribution; so is the division of the college into schools, of a congregation into various establishments.

From considering the chief kinds of wholes, we now pass to

(2.) **The basis of division.** This may be either internal or external. It is internal when we consider the inner specific nature; external when we make our division from a merely outward aspect of the properties of the whole, *e.g.*, in dividing living being into plants, animals, and men, and in dividing the cardinal virtue of fortitude into active and passive fortitude, the basis of division is internal or intrinsic; but it is altogether external in the Linnaean system of botany, and in the classification of a set of boys according to height. Moreover, whatever kind of a whole we may have, it is possible that it may be regarded from many points of view; and hence there may be many and very different bases for the division of the same whole; and thus we get many divisions which are not interconnected, or subordinate one to the other, but are strictly co-

ordinate and independent. Illustrations of this may be found in the division of terms and propositions (*q.v.*), and they are not difficult to meet with elsewhere. If I am writing an account of the Thirty Years' War, say, I may divide the period arbitrarily according to time into three decades, or I may mark it off according to certain distinctive notes into the Palatine, Swedish and Danish periods, or I may divide it by its chief battles, or by the alternations of Catholic and Protestant ascendancy, or in some other way. A class of boys I may divide into talented, mediocre and slow members, or into models and scapegraces, or into reliable and non-reliable students.

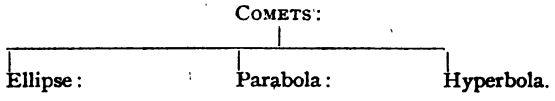
(3.) **The members or parts of the division,** to which apply nearly all the coming rules for division, may in their turn be divided; and these subdivisions may likewise be regarded as wholes, and cut up into further divisions; and so on through an interdependent series, by means of which we can see the whole in all its parts and in their mutual relations. Every subdivision is obviously subordinate to the division from which it is made, *e.g.*, wholes are divided into actual, potential and moral, while actual wholes are subdivided into physical, metaphysical and logical. Church history may be divided into periods of three hundred years, and each of these periods may be subdivided, and these subdivisions call for further division, and so on till our history is pretty fully mapped out.

XX. Rules for Division.

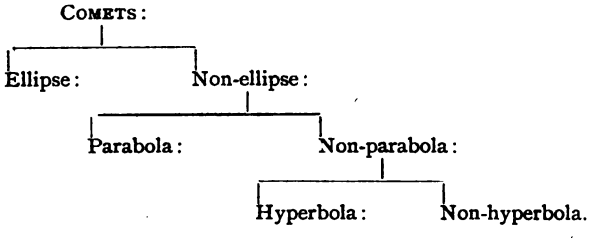
(1.) **The division must have a basis or founda-**

tion; for without it logical division would be impossible.

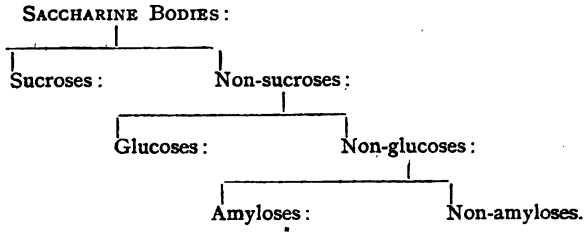
(2.) **It must be adequate and exclusive,** *i.e.*, it must contain every part of the whole, and only its parts. To secure this, the most logical way is to divide our whole or genus into two species only, one of which indicates a differentiating property, which the other denies, *e.g.*, if I classify comets according to their orbits:



It may be objected that it is not impossible for a comet to have, say, a circular orbit; but I can get out of every difficulty of this sort by stating my division thus:



It is evident that I have room here for every kind of orbit; and, if the next comet should happen to have a circular orbit, I can draw it or any other novel kind from my non-hyperbola. And, if I wish to make a perfectly good classification of saccharine bodies, I should state it thus:



But, if I divided all saccharines into sucroses, glucoses, amyloses, and glychol, my division would not be exclusive, for it contains something, viz., glychol, which is not a part of the whole, viz., saccharine. And, on the other hand, if I divided it into sucroses and glucoses only, my division would not be adequate, because it does not contain amyloses, which is a part of the whole.

(3.) **The parts of the division must be strictly co-ordinate**: hence no one of the parts can equal the whole, and no subdivision can stand in co-ordination with a primary division, or with any division higher or lower in the scale than itself, *e.g.*, suppose a school to be divided into six forms, and the first of those forms into two divisions, it would be logically inaccurate to speak of the division of the school as—first and second division, and second, third, and fourth form, for first form comprises first and second division, which are its subdivisions, and so are not co-ordinate with second, third, and fourth form. Similarly, to speak of Schiller's *Wilhelm Tell* as consisting of four Acts and the last three Scenes, or of Shakespeare's *Hamlet* as containing four Acts and two more Scenes, would be to give a faulty division, for in

each case the specified scenes constitute the fifth Act, which should be named in their stead.

(4.) **The parts of the division must mutually exclude each other,** *i.e.*, no one may be either partially or wholly contained in another. Thus, in the same division, I cannot divide Scotland into the Highlands and Lowlands *and* thirty-three counties, for the main division of Highlands and Lowlands includes the counties. Strictly speaking, this rule is not much more than an extension of the last. In some cases indeed, it is practically impossible not to violate it in the minor divisions of a classification; *e.g.*, in making a library catalogue, I may divide the books into those which treat of History, Biography, Science, Literature, Language, Geography, Art, Religious Questions, &c., &c.; but, however carefully I may make the classification, there will certainly be books in one class, which might equally well belong to another. Where shall I place a "Biographical History of Literature," for instance? It belongs alike to the History, Biography, and Literature divisions; and, if it should happen to be written in Russian or Chinese, why should it not rank under Language?

(5.) **The division must be regular or orderly.** This rule applies chiefly to subdivisions, which should be formed from the division next above them, so that there may be no break in the series of subdivided parts; *e.g.*, it would be incorrect to divide Logic into the matter of the act of the agent, and its form; for the primary division of agent, act, and end, which furnishes the whole, is ignored. In the same way, to divide the compounds of arsenic into

arsenic trioxide, arsenic peutoxide, arseniuretted hydrogen, arsenic disulphide, trisulphide, and pentasulphide, would be to leave out of count the previous division into oxides of arsenic, arsenic and hydrogen, arsenic and sulphur.

(6.) **Division should be short and simple**: hence it should be neither too comprehensive nor too detailed; otherwise, instead of furthering and elucidating a survey of the divisible whole, it will only render it laborious and puzzling. Labyrinthine subdivisions divert the mind from the main point, fix it upon minute details, and induce the very confusion they were intended to correct. Seneca says: "A thing divided to dust is as good as confused."

CHAPTER IX.

XXI. Argument. XXII. Demonstrative arguments.
XXIII. Rules for demonstrative arguments.

XXI. Argument or Demonstration. After having defined the subject of our inquiry, and divided it into its component parts, the next step is to establish the truth of our assertion through the medium of principles or grounds. This is done by argument, or demonstration in the wide sense of the word, and its end is to verify objective truth, and make it certain to our minds. The value of an argument in establishing Truth and Certainty depends entirely upon its force and the degree of evidence it exhibits, which may be either convincing

in various degrees, or the reverse. From this point of view, all arguments fall into two great classes, viz. (1.) **Certain or Demonstrative,** in which the evidence is in itself convincing; and (2.) **Probable or Doubtful,** in which proofs are merely probabilities, and therefore are non-convincing. It is obvious that, of these two classes, only the first can be called demonstration in the strict sense of the word.

XXII. A Demonstrative Argument or **Demonstration** strictly so called, is the deduction of the truth of a proposition from another proposition already known and recognized as true; and this deduction is accomplished by means of the syllogism, with which we are already familiar. Going back upon our knowledge of it, we see then that the basis of all demonstration must be the axiom that "Truth contains nothing but the true." Consequently, whatever necessarily follows from a certain truth must certainly be true; if a truth could contain false consequences, it would *ipso facto* cease from being truth. Consequently again, because "Truth cannot oppose what is true," whatever either contradicts or is contrary to a certain truth, must certainly be false. Of two contradictories, we remember, one must necessarily be true and the other false; and, as two contraries cannot both be true at once, if one is true, the other must be false. To get a clear idea of Demonstration, we must distinguish at the outset between its Matter and its Form.

As the **Matter** of every argument, we have first of all something to be proved, and this is called the

thesis or **proposition,** which is specified as a **theorem** if it is of a theoretical nature, and as a **problem** if its character is practical. The main point at issue, defended or opposed by several theses, and usually stated in interrogative form, is known as the **Question,** and the elucidation of the main theses and their dependencies and sub-dependencies is called generically the development of the **State of the Question.** Then there is something by means of which the thesis is proved, and which is called the **principle** or **ground** of demonstration. It may be either **immediate,** *i.e.*, when its truth is at once evident to the mind without proof (*principium per se notum,* which when of a theoretical nature is called an axiom), or **mediate,** *i.e.*, when its truth has to be made evident by proof. In this case, the principle of demonstration consists of an agreement used as the *principium demonstrationis* in the agreement based upon it, and it should be either already itself proved, or at least provable. If not actually proved, it is really assumed, and as such is usually termed a postulate. Then we have the syllogism, by means of which the thesis is deduced from the principle of demonstration, and which, we know, may be either simple or compound, thus furnishing either a simple or many-linked argument.

In contradistinction to its threefold Matter, the **Form** of Demonstration, or that which makes it what it is, is the **necessary consequence** of the thesis from the principle of demonstration. Only where there is such a consequence can there be an argument, for on it rests the truth of the deduction.

Lastly, it must be noted that Demonstration is

essentially dependent upon the *principia per se nota*, without which argument would virtually be impossible. The reason is this. If every proposition taken for the ground of demonstration, required proof, we should go on seeking it for ever, and our argument would never come to an end, and consequently would cease to be an argument. We had a parallel case in treating of definition. Just as definition would be impossible unless it started from, or—as we regard it—led up to indefinable concepts, so would argument be impossible unless primarily based upon, or—from our point of view—leading back to indemonstrable propositions neither requiring nor admitting of proof. Such propositions are either indemonstrable truths of the reason, which form the limit of argument from above, and will be treated of later on, and indemonstrable facts of internal and external experience, which limit argument from below. What need is there to prove, or indeed *how* can I prove by argument that I am thinking what example will suit my present point, that I am writing at a wooden table, and hear the sound of merry boys' voices in the playground?

So much for Demonstration in general. Before examining its divisions, which might be the next step in our inquiry, we will look at the

XXIII. Rules of Demonstration, or the Demonstrative Argument, which relate (1.) to the **thesis**; (2.) to the **principle or ground of demonstration**; (3.) to the **syllogism**, as the instrument of argument, and are the following:

(1.) The rule for the **thesis** is that its sense should be so **clearly determined,** that nothing else

may be proved but what has to be proved. Hence, before beginning an argument, the state of the question should always be sufficiently explained and set out clearly. Especially is such explanation necessary when, without it, the thesis might have many meanings, or be otherwise obscure; and it stands to reason that the explanation should be adequate and most lucid.

(2.) The **principle of demonstration** should be

(a.) **true and certain,** for what is doubtful and uncertain cannot be a basis of proof. This rule applies chiefly to objective arguments, but it must not be violated in subjective arguments *ex concessis* (q.v.).

(b.) It must be **acknowledged as true and certain** before it can become the ground of the argument, or basis of proof.

(c.) It must be **better known than the thesis,** otherwise it cannot answer its end of proving or elucidating the thesis.

(d.) Finally, it must be **quite distinct from the thesis,** for it is the principle by which the thesis is made known. Hence it should not express the same thing, nor have the same nature as the thesis.

(3.) Lastly we come to the rules for the **syllogism** considered as part of the argument. First of all, there must be **no violation of the laws and rules for the syllogism** (q.v.); and, secondly, **all its parts must be in themselves true.** To put it shortly, the syllogism, or series of syllogisms, must, in their whole extension, be both formally and materially true. In this respect, therefore, all the rules for the formal and material truth of the syllogism

apply with equal force to the argument. In direct opposition to the three classes of rules for the argument, stand fallacies or sophisms.

CHAPTER X.

XXIV. Fallacies or Sophisms.

XXIV. Fallacies or Sophisms are errors or mistakes in reasoning that mislead or deceive, and may be defined, arguments which appear to be regular, but are not so really. Hence a sophism does not consist in a false opinion, but in the bad reasoning or faulty argument by which it is reached. Sophisms are treated of next after the rules for the argument, because—after seeing how we are to do the right—it is natural to look how we or our opponents may get wrong, and because all sophisms may be included in classes corresponding to the division of these rules, inasmuch as they violate the laws laid down for the accuracy either of (1.) the **syllogism,** (2.) the **thesis** or (3.) the **principle of demonstration.** Sometimes sophisms are divided into **logical or formal,** *i.e.*, reasoning wrongly from right premisses; and **material,** *i.e.*, reasoning rightly from false premisses. Though this division is not here adopted, the letter F will indicate formal, and the letter M material sophisms, as they occur in the classification chosen.

(1.) **Contrary to the rules of the syllogism** are the sophisms of,

(a.) Amphibology or Ambiguity—F.
(b.) Composition and Division—F.
(c.) Collective and Distributive meaning—F.
(d.) Passing from a "dictum secundum quid" to a "dictum simpliciter"—M.
(e.) Fallacia accidentis—M.
(f.) The false cause.—M.

(a.) **Amphibology** or **Ambiguity** is a fallacy occasioned by using a word of two or more meanings, sometimes in one, sometimes in another of these meanings during the course of the same argument. The way to unmask this, is to distinguish the meanings in the premisses: *e.g.*

No one smiles but man;
This meadow smiles;
Therefore this meadow is a man.

The fault really lies in putting more than three terms into the syllogism. In the major premiss of our example the middle term *smiles* is taken in its ordinary meaning, whereas in the minor term it is used analogically. Again, the agnostic uses a fallacy of ambiguity when he says; "that which becomes a cause has passsd beyond its former bounds," and uses this assertion to support the thesis that the Absolute and the Infinite cannot be the First Cause, in other words that, if there is a God, He cannot be the Creator, stated as a syllogism, it would stand thus:

A cause in becoming a cause passes outside its former bounds;
But in the Act of Creation God becomes a Cause;

Therefore in that Act He has passed outside His former limits.

But this is impossible; and hence God the Creator is an impossible being.

Now the word cause is here used ambiguously. In the major premiss it is applicable to created causes only; in the minor to the uncreated cause; so we must confront the false conclusion with an emphatic *distinguo*. And *distinguo* too we must say to the coachman, who having heard his master tell a friend that certain conveyances were under lock and key at his office, and that it had been horse-work to get them drawn up by a specified date, concluded that the lawyer had become somewhat disordered in his intellect if he could make such an assertion. "Conveyances" to the serving-man signified only the contents of the coach-house, and possibly "horse power" was identified in his mind with horses; certainly he did not know that the legal deed, by which property is conveyed from one person to another, is termed a conveyance.

(b.) Composition and Division. This fallacy consists in using words in a composite sense, which are only true in a divided sense, that is to say, to infer that two predicates cannot be affirmed of a subject successively because they cannot be affirmed of it simultaneously, *e.g.*,

It is impossible that one who is awake should sleep;

But "Brother Jonathan" is awake;

Therefore it is impossible that "Brother Jonathan" should sleep.

The opposite fallacy, that of Division, is to use

words in a divided sense, which are only true in a composite sense, *i.e.*, to conclude that because two or more predicates can be affirmed of a subject successively, they can, therefore, be affirmed of it synchronously, *e.g.*

It is possible for one who is sitting to walk;
But Hecuba is sitting;
Therefore she can walk while she is sitting.

The fault lies in inferring in the conclusion what is not in the premisses, in violation of the second rule of the syllogism. The way to unmask this fallacy is to test it by the rules of the conjunctive syllogism.

(c.) The fallacy of **Collective and Distributive** meaning consists in using a term in any argument first in a collective, and then in a distributive sense, or *vice-versâ;* thus giving four terms instead of three to the syllogism. As with the fallacies of ambiguity, we must distinguish the meanings in the premisses, *e.g.*,

The Apostles preached the Gospel to the whole world;
But James was an Apostle;
Therefore James preached the Gospel to the whole world.

Here "Apostle" is just used collectively and then distributively. It would be a similar fallacy to say that every soldier in the Greek army put one hundred thousand Persians to flight, because the Greek army (combined) did so;

(d.) The fallacy of **passing from a "dictum secundum quid" to a "dictum simpliciter;"** or *vice-versâ*. This is done when from a major premiss,

which is only true with certain limitations, or under given conditions, a conclusion is drawn without regard to such limitations or conditions; *e.g.*

What you have not lost you have;
But you have not lost £2,000;
Therefore you have £2,000.

Now, in this example, the assertion in the major is only true with the limitation, that you already possess what you have not lost; but the conclusion is drawn without reference to any such limitation. As an instance of the same case we may take:

At your Latin lesson to-day, you say what you studied yesterday;
But you studied decimal fractions yesterday;
Therefore you have decimal fractions at your Latin lesson to-day.

In the major, "the Latin you studied" is evidently implied, but no such circumstance is recognized in the conclusion. The reverse of this is, from a major premiss, which is only true when stated without limitation or condition, to draw a conclusion which could only be true if the major were limited or conditioned; *e.g.*

You will read to-day what I wrote yesterday;
But you will read the history of De Rancé to-day;
Therefore I wrote the history of De Rancé yesterday.

In both forms of this fallacy, the fault lies in inferring more in the conclusion than is contained in the premisses; and the error must be called from its lurking place by a prompt *distinguo*.

(e.) **Fallacia Accidentis.** This fallacy occurs

when, from the fact of individuals belonging to any species, it is inferred that they are necessarily endowed with some property or capability, which belongs to the species not essentially but only *per accidens;* or when, from seeing a thing, that is good in itself, frequently misused by many persons, we come to consider the thing itself evil, and so condemn the good with the bad; *e.g.* Among lawyers there are many pettifoggers; hence every lawyer is as such a pettifogger. Philosophers have already done much harm in the world by means of philosophy; therefore philosophy in general is calculated to cause harm. And Rousseau uses a *fallacia accidentis* when he says: "Science and literature have produced much evil; therefore they are evil." At the two poles of human society—saints and rapscallions—a frequent basis for practical argument is the proverb, "What man has done can be done by man"; but it is in point of fact merely an instance of the fallacy we are considering. A sickly inmate of St. Thomas's Hospital might conclude, for instance, that being a man he can, like the Stylites of old, live on the summit of a pillar, and proceed in consequence to rear for himself some such singular place of abode, say, in Regent Circus or St. James' Park. Would not the authorities civil and medical speedily furnish him with a certificate of lunacy? And some priggish ignoramus might contend that, men having written the *Summa Theologica*, the *Principia*, the *Grammar of Assent*, and *Metaphysics of the School*, all men can write books equally profound and closely reasoned, and therefore that such undertakings are within

the limit of his own capabilities, while in reality he perhaps represents the very apex of sciolism. Again, the socialist is only putting the same premiss into different words, when he urges that "What man has belongs to man," and therefore that the rights of property do not exist; that, if honour is paid to one, it is the right of all; that, if authority is vested in a few, it should be extended equally to all, which simply means that it must be reduced to *nihil*. Some of the Temperance Tracts published are filled with sophisms of this and the class that will next be considered. From seeing that the excessive use of alcohol is evil, many people conclude that alcohol itself is evil, which is a hardly more rational conclusion than it would be to assert that study *per se* is evil, and to be avoided, because excessive study has weakened some few intellects and impaired some constitutions. A very striking instance of the *fallacia accidentis* occurs in a book called *Natural Religion* by the author of *Ecce Homo*, who thus seeks to disprove the Personality of God: "Personality, as we know it, involves mortality. Deities are usually supposed immortal. Personality involves a body. The highest theologies have declared God to be incorporeal." Here we have muddled up the essence of personality with two accidents which happen to accompany it in man as he exists on earth. It would be about as reasonable for a Red Indian to say that, all personality, as I know it, implies a red skin; hence God must be red. From the examples given it will be readily seen that the fault lies in arguing from particular cases to a general one, when we have no right to attribute the

quality or property in question to the essence or specific nature of the individuals in question.

(f.) **The false cause, or non causa pro causa,** is a fallacy which consists in adducing a mere antecedent as though it were a cause, according to the old sophistical adage, *post hoc ergo propter hoc*, when there is no sort of *nexus* between them beyond that of temporal or some other sort of accidental sequence; *e.g.*, the fall of the Roman Empire followed the establishment and spread of Christianity; therefore the foundation and spread of Christianity was the cause of the fall of the Roman Empire. The appearance of a remarkable comet preceded the fall of Constantinople; therefore it caused the fall of the city. The prisoner at the bar passed through St. Pancras' Station half an hour before the dynamite explosion took place; therefore he left explosives in the Station. The fault in all these cases is easy to detect, and lies in nothing else but in basing the argument on the supposition that, if one thing follows another, the first must be the cause of the second, merely because it comes before it. Meteorologists tell us that people, who believe in the unvarying influence of the moon upon the weather, fall into this fallacy, when they attribute changes in the weather to the moon having entered upon a fresh phase; and that it is much the same thing to attribute exceptional cold to brilliant displays of the Aurora borealis.

(2.) Contrary to the rules of the **thesis** are the various sophisms classed under the

Ignoratio or **Mutatio elenchi,** (M.) when the question is evaded by tacitly ignoring or misrepresenting it. This is done by proving the wrong con-

clusion, that is to say, a proposition which—by more or less resembling the question—is likely to be mistaken for it. **Elenchus** is the name given by Aristotle to the contradictory of our opponent's statement, and this contradictory must be proved in order to refute him, successfully. The fault lies in violating the rules for proving the contradictory of propositions; and is distinguished as **Ignoratio** when committed unknowingly, and as **Mutatio elenchi** when committed designedly. The ways in which a question may be thus evaded are very various. Sometimes a meaning different from its real one is assigned to the thesis; and so a point is established quite different from the one which should have been proved; *e.g.*, suppose the thesis for proof to be, that man is free in so far as he is able to choose and decide in his actions; and instead of this it is proved that he is free in the sense of living under and being responsible to no law. And, if we argue that the Second Person of the Blessed Trinity, being God, must be eternal; yet, having been born in time, cannot be eternal; and therefore is eternal and not eternal; which is impossible; and hence, because He must be either the one or the other, He is either not eternal, and consequently not God; or he is eternal, and consequently not man; we are giving a false meaning to the thesis, which regards only the Nature of the Second Person of the Blessed Trinity while the conclusion not only refers to two but gets on the wrong track by assuming their union in one Person to be an impossibility.

Sometimes in refuting an opponent, something is proved which he did not deny, or something is

disproved which he did not assert; *e.g.*, when the Port Royal ladies were charged with Jansenism, they said they were not Jansenists but religious. This was clearly evading the question about as rationally as did the Irishman who, when charged with being drunk and disorderly on the evidence of five witnesses who had seen him so, proposed to call fifty witnesses who had not seen him. To prove what is not denied, and to disprove what is not asserted, are common practices in law courts, where they are often effectually used to produce a prejudice. A bank clerk, for instance, or a lawyer's cashier, pleads guilty to a charge of embezzlement; but urges in extenuation that he has been exposed to great temptation, misled by bad companions, and induced by the poverty or misery of his home to commit crime. In such a case, the counsel for the prosecution will, nine times out of ten, ignore the point in question, viz., whether the circumstances adduced extenuate the prisoner's guilt, and insist upon what is not denied, that he has actually committed the crime, and so must have been dishonest. Not many years ago, when two landlords went to law about the proprietorship of a small stream, which for some distance divided their respective estates, the counsel for the defence effectually created a prejudice and virtually determined the verdict by proving that in the title deeds of the defendant's estate there was mention both of the stream and of its name, while neither could be found in those of the plaintiff—a point which had never been asserted, and which—when the case was taken to a higher court—proved quite beside the question.

Sometimes again, this fallacy takes the form of proving too much or too little,—which is, in point of fact, to misrepresent the question. In proving too much, people draw from an argument not merely the conclusion which formed its thesis, nor further conclusions legitimately drawn from it, but other consequences which are false and often absurd; this, for instance, is what the materialists do with their assertion that the brain is the thinking principle within us, when they say: thought is dependent upon the brain; hence the brain itself is that within us which thinks. Now this is clearly to prove too much; for it would follow that in every case in which one efficient cause was dependent for its action on another efficient cause, the principle of this action would be the cause on which the immediate efficient cause of the action was dependent: this illustration shows the force of the saying: he who proves too much, proves nothing. Too little is proved when part of the thesis is suppressed; and though the conclusion may be true of that portion which has been made the matter of argument, it cannot be true of the thesis as a whole, and so cannot be brought forward at its conclusion; *e.g.*, if anyone, in proving free will, made use of an argument from which could be inferred only part of that freedom, it might be quite true with reference to that part, but it would be valueless as a proof of the whole of the thesis. So again, if I had to prove that a class of ten boys had passed their examination, and I only proved that some two or three had done so, I should be proving too little, and evading part of the question; and, if I had to prove to an

anxious parent that his boy had been eminently successful, and I wandered away into proofs of the eminent success of every boy in the College, I should on the contrary, be proving too much, to say nothing of making myself a very decided bore.

A further way of evading the question, and proving the wrong conclusion is, in weighing alternatives, to keep out of sight those that we have some interested motive in ignoring, and to rest our argument on those that coincide with our views. Suppose, for instance, a young fellow wants to go to sea, and asks his father whether or not such a course would be advisable for him. We will suppose the father to be a confirmed landsman, intolerant of salt water and her Majesty's navy in general, and of her Majesty's midshipmen in particular. In ninety-nine cases out of a hundred, such a man would bring forward a whole litany of objections against his son's wish, and think that the force of the objections should prove that he ought to abandon it. Here we have nothing but an *Ignoratio Elenchi;* for the point proved is, merely that there are weighty objections against the plan; while the point that ought to have been proved is, whether there are more weighty objections against its adoption than against its rejection, or *vice-versâ, i.e.*, whether the arguments in its favour outweigh those adduced against it. Similarly, people of every shade and degree of prejudice, are apt to keep out of sight, or at any rate to under-estimate every alternative which clashes with one of their foregone conclusions. A report is set in circulation to the discredit of Tostig Harold; it reaches the ear of John Thomas who,

for some reason, has power to investigate it; John Thomas has a settled aversion to Tostig Harold, and is not in the habit of giving him credit for good intentions; but, in the present case, he professes strict impartiality, and "talks big," as our American cousins say, about daily balancing *pros* and *cons*. Is it likely that his prejudice and aversion will keep out of the scale? Not a bit of it. Just as the land-loving, sea-hating father is trapped into a fallacy, so, if we may believe the evidence of everyday facts, does the strictly impartial John Thomas evade the question by ignoring the *pros* for Tostig Harold, and establishing a wrong conclusion supported on the *cons plus* aversion and prejudice. Such, unfortunately for the interests of truth, is the method of procedure adopted by a certain class of writers who, while professing to be above prejudice, are so far its victims that they give to facts the colour of their prepossessions, and only take cognizance of such arguments as lie along the narrow vista they see before them.

(b.) This appears to be the right place to point out the mistake—which hardly seems to be recognized by logicians as a fallacy—of supposing that the failure of an argument proves the opposite conclusion. Logically it cannot do so; for, as we saw in treating of propositions, though the falseness of one contrary may be inferred from the truth of the other, yet from the falseness of one the truth of the other may not always be inferred, because sometimes both contraries may be false. Practically, however, the failure of an argument may tend to, and indirectly strengthen the proof of the opposite

conclusion. In a court of justice, for instance, when the case for the defence breaks down, it cannot be inferred that the case for the plaintiff will necessarily be established, though this often takes place in fact.

(3.) Contrary to the **principle** or **ground of the argument,** are the fallacies of:

(a.) Begging the question . . M.
(b.) The vicious circle . . . M.
(c.) False generalization . . M.

(a.) **Petitio principii,** or **begging the question,** consists in taking for the ground of the argument, and so assuming as true, what requires to be proved. This may occur in different ways, though some logicians limit the extent of the *petitio principii* to its most usual form, which is to say the same thing twice over in different words, and then make one statement the proof of the other. Thus the thesis is made to do duty for the ground of the argument, and the former is proved by means of itself, *e.g.*, if I say that the soul is immortal because it lives for ever, or because it never dies, I am making a true statement twice over, but I am not proving the immortality of the soul. If I try to prove that the earth moves round the sun, and argue that because the sun is at rest (as regards the earth), the earth moves round the sun, I am begging the question: for, in saying that the earth moves round the sun, I imply that (with regard to the earth) the sun is at rest, and hence I take for the ground of my argument something contained in the thesis. Molière gives us a capital instance of this form of the fallacy in the physician Ignarelle, who tells the father of a

dumb girl that her infirmity is easy to explain, "she has lost the power of speech." "Yes, yes," presses the father, "but the cause, if you please, why she has lost the power of speech." "All our best authors will tell you," readily retorts Ignarelle, "that it is the impeding the action of the tongue." Again, why can I see through glass? Because it is transparent. Why can I break glass? Because it is brittle. Why cannot Ernest see? Because he is blind:—are all cases in which I beg the question, and prove nothing, because my proofs are no proofs whatever, since the thesis is repeated in different words.

Another way of begging the question is to use a word signifying disapproval, *e.g.*, unfair; and then say because some act or other was unfair, it should not have been done. For instance, James got his marks unfairly; no one should get marks unfairly; therefore James should not have got his marks. The argument looks quite right; but it should first of all have been proved that the marks were got unfairly in the accepted use of the term; instead of which this is taken for granted. Personal or corporate infallibility, too, is taken for granted in arguments based on such phrases as, "I have never heard of such a thing," "*we* have never taught that," "it is not according to *my* ideas," "it does not please *my* eye." Some examples: When Buckingham, urging that the young Duke of York ought not to have the right of sanctuary at Westminster, argues

> Oft have I heard of sanctuary men,
> But sanctuary children ne'er till now,

he is basing his argument on the suppressed premiss,

"whatever I have never heard of cannot possibly be right"—an assumption which any man living has a right to call in question. And, when old world teachers demur to accept the results of modern investigation and discovery, on the mere plea that "we have never taught that," the ground of their argument is the lucid if not luminous statement, "whatever we have never taught cannot possibly be right"—a very patent absurdity. "Is this book suited for young people?" "Certainly not; it is not according to my ideas." "A proof *that*, which requires to be proved," any sensible man would mentally ejaculate. A group of young people are "doing the critical" in the National Gallery; they stop before a picture. "Something wrong in that drapery," remarks one. "Quite sure of it," puts in another, "it does not please my eye." "Humph," thinks a more logical passer-by, "what displeases that young person's eye cannot possibly be right. Surely this basis of argument calls for proof." Many of these examples might be adduced equally well as instances of the fallacy *non causa pro causa*; but this fact does not make them severally any the less a *petitio principii*, for in each the ground of the argument is a gratuitous assumption demanding proof. The same may be said of the widely accredited piece of fallacious reasoning, that "as the non-existence of space cannot by any mental effort be *imagined*, therefore the non-existence of space is absolutely *inconceivable*." Without striking into deeper strata than we are examining in these simple Logic lessons, we shall, if we examine this specious argument carefully, find a place for it in several classes

of fallacies. Confining our attention, however, to its basis or ground, we see that it rests on the suppressed premiss that, *what we cannot imagine we cannot conceive*, a statement in which there is a palpable error of confusion, material imagination being confused with immaterial thought, and practically identified with it. Until they are proved to be identical, I accept no conclusion based on their identification.

(b.) The **vicious circle.** This fallacy consists in proving one thing by means of another, and that other by the first of the two things thus presumably proved, *i.e.*, the thesis by the ground of demonstration, and this last by the thesis. For instance, to prove the existence of God from the existence of the world, and then to prove the existence of the world from the existence of God, would be to argue in a circle. The longer the chain of reasoning in which this is done, the more likely is the fallacy to escape detection. To take other examples: if I try to prove a boy's diligence during Term by his success at the examination, and then prove his success under examination fire by his diligence during Term, I am very palpably arguing in a circle. Under a cloud of words to conceal the device, this was the method of reasoning used not long ago about a controverted will, which was declared genuine because it bore the signatures of witnesses and testator, while the genuineness of their signatures was next deduced from the genuineness of the will itself. These two instances will serve to show, however, that the fallacy in question takes place when we are arguing with one person, or rather with one partisan or

opponent (these may sometimes be a collective body); for it is obvious that, in arguing separately with many persons, it is quite legitimate to make the thesis of our argument with one, the ground of our argument with another, for then the two arguments are quite distinct; *e.g.*, it may be allowed that a boy has been diligent during Term, but denied that his examination was a success; while someone else may consider his examination brilliant, but call in question the Term's diligence. Now, if I have reason to believe that he was both diligent and successful, there can be no possible objection to my naming his diligence as a proof of his success to one person, and his success as a proof of his diligence to somebody else; and no one can charge me with arguing in a circle. And a man believing in the genuineness of the controverted will, was quite justified in bringing forward the signatures as a proof of its genuineness to one party, and to another its intrinsic genuineness as a proof of the genuineness of the signatures. If a negress, recently freed from slavery, came to me believing neither in freedom nor in responsibility; and if, in the attempt to rectify her ideas, I proved responsibility from freedom, and then proved freedom from responsibility, I should certainly be arguing in a circle, and possibly leave her ideas as much confused as would be my own reasoning powers. We will suppose that the good woman's husband comes in search of her. To meet the requirements of our example, he must be my next disciple. I find he has a very decided belief in freedom, but is innocent of any faith in responsibility; so I indoctrinate him on the matter, basing

my argument on freedom. Before the week is ended, I go into the hospital and find there a poor Indian woman converted to Calvinism some years ago. That there is such a thing as freedom, she will not admit; but her sense of responsibility is helping to kill her. If, for her comfort, I sit down by her side, and bit by bit prove freedom to her very simply, basing my argument on responsibility, no one will dream of saying that I am arguing in a circle, because, only a few days before, I had made freedom the basis of my argument for responsibility with the negro.

In purely objective scientific arguments, however, we must always suppose that we are arguing only with one person, and so must never under any circumstances make use of an argument of which we have the conclusion in one of the premisses, *i.e.*, argue in a circle.

(c.) **False generalization,** or **invalid induction** consists in making the ground of the argument a proposition which seems to be universal, but is not so really, and then arguing from the simulated universal to particulars. Instance the celebrated sophism: Epaminondas said, All Cretans are liars; but Epaminondas was himself a Cretan; hence he lied; hence the Cretans are not liars; but Epaminondas was a Cretan; hence he did not lie; hence the Cretans are liars; and so on *in infinitum.*

Under the head of false generalization fall naturally all violations of the rules for the validity of induction, which we shall speak of just now, even though they may not be directly contrary to the rules for the ground of demonstration, and though

they may also belong at the same time to some other class of fallacies than that of invalid induction. Thus we sometimes argue that what is true of many things considered universally, is also true of something which does not come under the rule; in other words, we give to a mere moral universality the scope of an absolute universality; *e.g.*, we know that the French as a nation hate the Germans; but we have no right to infer that all the French in London hate all the Germans in London, or that all the French boys in a cosmopolitan college hate all the German boys. In the same way, because Presbyterians as a body exclude enjoyment from their Sunday programme, we cannot infer that this will necessarily be the case in every Presbyterian family. In these instances the fault lies in extending the generalization too far.

Sometimes also, we argue that what is true only of some things in a class, is true also of all things in that class as such. This we have already considered as the *fallacia accidentis*, in which we err by arguing from a particular case to a general rule, as did a maiden lady of an uncertain age, who, on hearing of the dynamite attempt upon the Tower and Houses of Parliament, declared that public buildings *en masse* had been proved dangerous, and therefore she would never again enter one, "no, not even a church."

Again, we sometimes argue from a particular case to another particular case, which has only an apparent and not any real connection with the first. This is sometimes called the fallacy of *a non tali pro tali*, and is only a kind of fallacy of false analogy (q.v.); *e.g.*, it would be simply absurd to argue that,

because I may kill a man in self-defence, I am at liberty to kill Carey for abandoning the Prince Imperial in danger, for there is no parallel whatever between the two cases. And for the same reason, when Gordon was holding Khartoum, I had no ground for concluding that, because the French had the worst of it at Sedan and Metz, General Gordon would have the worst of it at Khartoum; though this need not have prevented me from thinking upon quite other grounds that his chances of success were never higher than a minimum. Sophisms, which under one aspect may be classed as fallacies of ambiguity, may from another point of view have a still better claim to be regarded as instances of the form of false generalization with which we are at present engaged. In proof of this, some of the examples given of the fallacy of ambiguity may be re-examined. Passing to a fresh one, we find a little fellow innocently juggling with the word *light*, and reasoning from special cases to other special cases, between which there is not the connection assigned as the ground of the argument. He may say, for instance, "Fire and gas and lamps are light, and they do burn my fingers; how the little boys and girls in the transformation scene of the pantomime must be burning; how the big light moon would burn my finger, if I could put it in."

In concluding this outline of the sophisms, it may hardly be necessary to note that, when we have detected one flaw in a specious piece of reasoning, it does not follow that we have discovered all its weak places; for, as has been shown, a single false argument may contain more than one fallacy,

and a single fallacy may belong at once to more than one class: hence the saying "a fallacy is a nest of fallacies"; and hence too the parts of the division of fallacies cannot mutually exclude each other.

CHAPTER XI.

XXV. Kinds of demonstrative arguments.

XXV. Kinds of Demonstration or Demonstrative Arguments.

According to the point of view from which they are regarded, Demonstrative Arguments may be:

(1.) a priori, or a posteriori;
(2.) direct, or indirect;
(3.) objective, or subjective;
(4.) progressive, or regressive;
(5.) main, or subordinate;
(6.) deductive, or inductive.

(1.) **A priori or a posteriori.**

(a.) An **a priori** argument is one in which the proposition, that is the ground of demonstration, is also either the objective reason, or the cause of the thing we are proving: hence, in an argument *a priori*, we reason either from the reason to the result, or from the cause to its effects, or from the essence of a thing to its properties; *e.g.*, we can prove responsibility from free-will, which is its reason, inasmuch as responsibility results from free-will; we can prove the existence of the natural order of the world from the infinite goodness and wisdom

of God, as effect from cause; and we can prove the immortality of the soul from its spirituality, thus deducing a property from the essence.

(b.) An **a posteriori** argument is one in which the ground of demonstration is the objective result or effect of the thing proved: hence we argue from the result to the reason, or from the effect to its cause, or from the properties of an object to its nature; *e.g.*, we argue *a posteriori* when we prove free-will from responsibility, because we argue from the result to its reason; in proving the existence of an all-wise and beneficent Creator from the existence of the natural order in the world around us, we argue from the effect to its cause; and, in proving the spirituality of the soul from its power of thought, we reason from a property to the essence.

Thus, in demonstrating anything *a priori*, we proceed from what is prior to what is posterior in the order of *things*, quite independently of our knowledge; while in demonstration *a posteriori*, on the contrary, we begin with the matter of our previous knowledge, *i.e.*, with what is posterior in the order of *things*, and lead back to what is prior. Mathematical proofs, for instance, are of the *a priori* kind; whereas the conclusions of experimental science are gained *a posteriori*. Why the latter method should be queen-regnant in the domain of historical criticism, and why the *a priori* argument nevertheless holds a corrective office there, we cannot learn better than from the great Belgian Bollandist, Father de Smedt, S.J.[1]

[1] *Principes de la Critique Historique*, chaps. ii. and xvii.; and *Introductio Generalis ad Historiam Ecclesiasticam critice tractandam*, tract. i.

(2.) **Direct or Indirect.**

(a.) **Direct** arguments are those in which the truth of a thesis is proved in such a way as to show that the thesis is already granted implicitly, or rather potentially, in granting the ground of the argument, and so must be true in consequence of that ground being true. Hence, the middle term of the syllogism must be some *undisputed* truth, which either agrees or disagrees with the extremes of the proposition; *e.g.*, if in proving the incorruptibility of the human soul, I take for the ground of proof the proposition, "the soul thinks," and from thought deduce the immateriality of the soul, from this its simplicity, from its simplicity its indissolubility, and therefrom its incorruptibility, my argument would be a direct one. And so too is the following: Immutable Being is eternal; God is immutable Being; therefore God is eternal.

(b.) **Indirect** arguments are those in which the truth of a thesis is proved by demonstrating the falseness of its contradictory. To demonstrate the falseness of this contradictory, we should show the false or absurd consequences that inevitably result from it; and from these consequences deduce the falseness of the source from which they flow, according to the axiom: What is false results only from what is false. Under this aspect, that is to say, inasmuch as the contradictory of the thesis is carried on to its false and absurd consequences, the indirect argument is called an **argumentum vel reductio ad absurdum**; *e.g.*, if I were to say, in proving man's free-will: If man were not free, he would not be responsible, for he would be incapable

of responsibility; if incapable of responsibility, he would be incapable of merit, of sin, of reward, and of punishment; but all this we know to be false and absurd; hence man cannot be not free, *i.e.*, he must be free,—my argument would be obviously a *reductio ad absurdum*. Again, in proving the moon to be an opaque body, we argue indirectly when we say, we know that the moon's interposition between the sun and the earth occasions an eclipse of the sun; but, if the moon were a transparent body, her interposition would not obscure the sun's light; hence she cannot be transparent; hence she must be opaque. The indirect mode of argument is often used in mathematical demonstration, *e.g.*, one line is proved to be equal to another, by proving that it cannot be greater, and that it cannot be less; it must be either greater, or less, or equal; so, when we have shown that it is neither greater nor less, we have indirectly proved that it must be equal.

Thus, we see that a direct, or—to give it its technical names—an apodeictic or ostensive argument, goes straight from the ground of demonstration to the thesis; while an indirect or apagogic argument, on the contrary, goes in what may be called a roundabout way, by first of all proving from the ground of demonstration the falseness of the contradictory of the thesis, and not till then proving the truth of the thesis. The scientific value of the direct argument is clearly greater than that of the indirect, because the direct shows how and in what degree the thesis must necessarily be true, and indirect arguments do not do this. Their force, however, is in no way less than that of the more satis-

factory and scientific direct arguments; and their use is a necessity when, from the nature of the case, apodictic demonstration is impossible. To demonstrate directly the falseness of perfect scepticism, for instance, is an impossibility, because there is no foundation for an argument, that is not pre-occupied by doubt. Under its interdict lie the infallibility of the reasoning faculty and of the understanding, as well as the formal laws of thought. But we can expose its intrinsic absurdity thus: either the sceptic doubts the truth of his scepticism, or he does not. If he does doubt, the categorical enunciation of his doubt is absurd. If he does not doubt, he gives the lie to his own system, seeing that there is something about which he does not doubt, viz., his philosophy of doubt.

(3.) **Objective or Subjective.**

(a.) An **objective** argument (**argumentum ad veritatem**) proceeds from a general principle of demonstration, and therefrom proves the thesis, without taking into account our partisan or opponent's frame of mind, or the manner of regarding the matter, which he has made his point of view.

(b.) A **subjective** argument (**argumentum ad hominem**), on the contrary, is one in which we place ourselves at the point of view occupied by the person for or against whom we are arguing, and argue from some principle which he recognizes or accepts as true, that is from his "professed principles." This may be done in two ways, viz., either by putting ourselves on a level with the persons with whom we are arguing, and proving our thesis from such principles as we know they cannot fail

to understand; or by arguing *ex concessis,* that is by taking as a principle of demonstration something already granted or conceded as true by our adversary, and from it either proving to him the truth of a proposition or disproving his false thesis. In this last case the argument is called Retorsion; we had an example of it in showing how a dilemma can be turned against ourselves.

Objective arguments are sometimes called **absolute,** because the general principles from which they proceed are certain, and should be universally admitted: while subjective arguments are called **relative,** because their principles, if not universally admitted, must at least be held to be true by those with whom we argue, whether these principles be in themselves true or not. In seeking truth for its own sake, and hence in purely scientific matters, we must obviously make use of objective or absolute arguments; but, in demonstrating or pressing a point home to individuals, and perhaps still more to masses of men, it is equally clear that a subjective or relative argument will serve our purpose better; and it is perhaps so true of nothing as of these two classes of arguments, that "what is best in itself is not always the most expedient." As instances of each kind, we may contrast a judge's "summing up" of a trial with the speeches made by parliamentary candidates when canvassing for votes before an election. The judge's summary of evidence is an evident case of an argument *ad veritatem,* and so, according to *Blackstone,* should be the preceding speeches made by the counsel for plaintiff and defendant respectively.

This accounts for the value attached to "precedent" in legal decisions, which have to do with an objective standard of right and wrong explained and elucidated, though not primarily determined by "law," and so which are not swayed by subjective or personal arguments. The speech of a parliamentary candidate, on the other hand, must be very largely an *argumentum ad hominem*, if it is to attain its end, and help the speaker to a seat at Westminster. In insisting upon a point, it might be in itself the best, but it might be far from the most expedient to argue from a general fact or principle as such, for probably half his hearers would be unable to follow him; but, if the same point were put before them as the outcome of their professed principles, or as being necessary to the consistency of their avowed line of conduct, the candidate's chance of success would be far greater, in so far as it depended upon argument, which—as a matter of fact—is by no means the largest factor in working the sum of popular votes. Some of the best examples of an *argumentum ad hominem* may be found in St. Paul's Epistles, *e.g.*, to those who admitted Christ's teaching, but denied that we shall rise again from the dead, he says that, if it is true that we shall not rise again, Christ did not rise again; if He did not rise again, His preaching is vain; and if his preaching is vain, our faith also is vain; but it is admitted that He rose again, that His preaching is not vain, and that our faith is not vain: hence, *ex concessis*, it must be admitted that we shall rise again from the dead. The familiar story of the young rhetorician

and his master well exemplifies the *argumentum ad hominem* in the form of retorsion. An old sophist undertook to instruct a young rhetorician in pleading, on the understanding that he should be paid when his pupil gained his first cause. The master sued for the reward, whereupon the scholar sought to evade the claim by a dilemma. "If I gain my cause, I shall withhold your pay, because the award of the judge will be against you; if I lose it, I may withhold it, because I shall not yet have gained a cause." Whereupon the master retorted: "If you gain your cause, you must pay me, because you are to pay me when you gain a cause; if you lose it, you must pay me, because the judge will award it."

(4.) **Progressive or Regressive.**

(a.) **Progressive** arguments or, as they are sometimes called, **synthetic**, are those in which we start from the ultimate principle or ground of demonstration, and from it descend through a series of syllogisms to the thesis, *e.g.*, I meet with a man who, from professing general "know-nothingness," has come to question the very palpable evidence of sense that he is a *substance*, yet, with strange inconsistency, concedes, the substantiality of living beings in general and as such. Quite enough that for my purpose:

Living being is substance;
But an animal is a living being;
Therefore an animal is a substance.
But man is an animal;
Therefore man is a substance.
But you, Malcolm Mactab, are a man;

Therefore you, Malcom Mactab, are a substance.

(b.) In **Regressive,** or **Analytic** arguments, we go through the precisely reverse process, *i.e.*, we prove the thesis by the principle of demonstration from which it immediately proceeds; then prove this by the one next above it; and so on through the series till we reach the ultimate principle or ground of demonstration; *e.g.*, Malcolm Mactab's nephew, Duncan Dewdrop, shares his uncle's difficulty about self-substantiality, but concedes only that he was Duncan Dewdrop yesterday, is Duncan Dewdrop to-day, and was Duncan Dewdrop grinding at Latin gerunds ten years ago. Yet Duncan Dewdrop, you *are* a substance, because

Duncan Dewdrop is a man;
But man is an animal;
Therefore Duncan Dewdrop is an animal.
But an animal is a living being;
Therefore Duncan Dewdrop is a living being;
But living being is substance;
Therefore Duncan Dewdrop is substance. Other examples of this way of arguing have already been given in treating of the polysyllogism (q.v.).

(5.) **Main or subordinate.**

(a.) A **main** argument is that one which has the greatest force with reference to the thesis, inasmuch as it really proves it; *e.g.*, a notorious burglar charged with breaking into a house at Hammersmith, is discharged without much examination mainly because he can prove an *alibi*, and show that, at the time of the robbery, he was actually finishing a term of imprisonment at Cardiff.

(b.) **Subordinate** arguments are such as serve, by

their connection with the main argument, to elucidate the thesis still further by showing its truth when regarded from other points of view. Of themselves they would not be sufficient to establish its truth in the given case; but in dependence on the main argument they are most useful in making this truth clear when regarded in various aspects. Examples of subordinate arguments will often be found among the proofs for the **necessity** of anything, *e.g.*, of law, of which the need becomes more and more apparent according to the number of aspects under which it is regarded.

(6.) **Deductive or Inductive.** Before distinguishing the kinds of demonstration known as Deduction and Induction, it may be well to make the preliminary observation that the popular meaning of these two words in English seems to be an exceedingly vague one, which, like all other vague meanings, is apt to be misleading. All reasoning of the kind we have been considering, is marked off in an indefinite sort of way as deductive or syllogistic, because we deduce or lead down the truth from premisses to a conclusion; while induction is held to be the process of collecting and investigating facts, forming hypotheses, and then deducing inferences from the hypotheses, to which the facts when ascertained have given birth. On the face of it there are at least two big blunders to start with in any such explanation as this. In the first place, the definition of formal logic must have made it clear that, as far as induction is taken to mean a process of inquiry, it is altogether outside the province of formal logic, the office of

which is, not to *get* premisses, but to see if any, and what conclusions can be drawn from them when got, no matter how. In the second place, when we deduce inferences from the hypotheses which are the result of our fact-gathering, what are we doing but going through a process of deductive reasoning capable, like every other such process, of being thrown into syllogistic form? Hence, the rules for Division, which we have already studied, will tell us that, in the popular acceptation of the terms, Induction includes Deduction, and so that the distinction must be inadequate, and consequently that the Division is faulty. How Induction—as a process of reasoning—is reducible to the syllogistic form, and is in fact nothing else but a syllogism, we shall see just now. So far it is clear that, though Deduction and Induction have each a distinct meaning of their own, it is not that which passes current in ordinary parlance. Equally untenable too is the view which identifies Deduction with Demonstration, and considers Induction as an essentially distinct form of reasoning, having nothing whatever in common with Demonstration. So far is it from being essentially distinct from Demonstration, that it is nothing whatever but one of its many forms, standing to it in the relation of species to genus; for the simple reason that, as Demonstration or Demonstrative arguments are, in contradistinction to probable arguments, those in which the thesis is *shown* to be certain, or is "proved to demonstration," and as this is likewise done by Inductive reasoning, Induction must be comprised among

the various kinds of Demonstration. Hence too, Deduction cannot be identified with Demonstration, or it could not be contrasted with Induction which is a form of Demonstration; for it would be a very incorrect division indeed—in fact no division at all—that would seek to contrast a whole with one of its parts. Supposing, for instance, we tried to divide fan-tail into fan-tail and fan; or lion into lion and mane; or "honourable stops," as a writer in *Merry England* has called them, into stops and colons.

(a.) In its wide meaning **Deduction** may be taken as identical with every argument *a priori* (q.v.); but strictly speaking, as the correlative of Induction, it is a particular form of the *a priori* argument, one in which we draw out a particular from a general truth, on the assumption that what is true of the whole must be true of each part. Its most general formula is that, **what is or is not predicated of the universal, is or is not predicated of the particular.** Thus we reason deductively from the genus to the species, and from the species to the individual, *e.g.*

Every animal has five senses;
But the horse is an animal;
Hence the horse has five senses.
Every horse is a quadruped;
But Bucephalus was a horse;
Therefore Bucephalus was a quadruped.

In these two examples the *a priori* element in deduction is readily discernible; for the horse has five senses *because* it is an animal; and, if Bucephalus had not been a quadruped, he would not have been a horse.

(b.) **Induction**, in its wide meaning, is a simple

synonym for every argument *a posteriori;* but, taken in its exact signification, it is that form of the *a posteriori* argument, in which we reason from the parts to the whole, or from the particular to the general or universal, *i.e.*, from individuals to the species, or from like facts or phenomena to a general law, according to the formula that, **what is or is not predicated of every particular, is or is not predicated of the universal.** Herein the *a posteriori* element at once reveals itself; for, when we argue from the particular to the general, we have *eo ipso* an argument from result to reason, or from effect to cause, seeing that particulars stand to the universal, under which they are comprehended, in the relation of result to reason, or of effect to cause. For instance, when we find that all birds we know of have warm red blood, and infer that warm red blood is an essential property of all birds, we argue from result to reason; and when, from seeing that bodies are always expanded by heat, we conclude that the expansion of bodies by heat is a universal physical law, we argue from the effect to its cause. In both our examples, we have gone through the process of inferring that a proposition is true universally from finding it to be true in a number of particular instances; but in neither case is our conclusion based on an enumeration of *all* the particular instances that might be adduced. Hence our induction is an incomplete one. Indeed there are very few cases in which induction can be complete, *i.e.*, in which all the individuals comprised in a species, or all the cases in which the effects of some particular law of nature are observable, can be enumerated. Besides

being practically impossible, such an enumeration would be simply useless, for then we should be arguing not from the particular to the general, but from all individuals to all individuals again, from the known to the known, not from the known to the unknown; *e.g.*, we should be wasting words to no purpose if, to someone who knew that the family of Sennacherib Scatterbrain consisted of three sons, we said—Peter, James and John Scatterbrain are all in London; therefore all the sons of Sennacherib are in London. So it comes to this, that our enumeration, though not exhaustive, must be sufficiently full to warrant our drawing the conclusion that, what is true of the individuals or of the particular cases, is true also of the species or of the general law; and to do this rightly we must act upon the axioms that form the very basis of Induction, viz., that **like principles have like results,**—and **like (physical) causes like effects.** Only by proceeding from these principles can we form a true inductive argument. The reason is a simple one. When, from observing that a certain property belongs to all the individuals of a species, that fall within the limits of our personal experience, we conclude that the property in question is to be found in all other individuals of the species, we do so because we attribute the property to the specific nature of the individuals, as to its principle, on the ground that the same specific nature as the principle of these properties and qualities, must be accompanied by them as its results. Similarly, in leading back from effect to cause, and arguing from the constant uniform recurrence of certain phenomena

observed by us, that in all other cases unknown to us they actually exist, we attribute the phenomena to the specific nature of their common cause, on the ground that like physical causes, in so far as their action is unimpeded, must always produce like effects. No explanation is needed to show that the two principles we have been considering are first principles; hence they must be both universal and necessary, and moreover be in themselves sure and certain. From this therefore we **conclude**:

(*a*) that the truths or conclusions arrived at by means of Induction are universal and necessary, because they result from the application of general and necessary principles to what is particular and contingent; for instance, our two examples about the warm red blood of birds, and the expansion of bodies by heat, are undoubtedly universal and necessary, *i.e.*, there is no exception to the rule, and every individual case proves its necessity.

(*β*.) Yet, in the case of a general law of nature, the universality and necessity ascertained by means of Induction only are conditional; for it may happen that the action of some other law of nature may under certain circumstances interrupt the action of an otherwise uniform law, or that this last may be sometimes suspended by the interposition of God's power; *e.g.*, it may be that, under some exceptional circumstances, heat will not expand a body in consequence of the counter-action of some other physical law. And, although it is quite true that the law we have gained from induction—"every body which is specifically heavier than water sinks in water"—is in itself both necessary and universal; yet, by the

miraculous intervention of God's power, there have been exceptions to this law, as, *e.g.*, when our Lord Himself and some of His saints during the last eighteen centuries walked upon the waters.

(γ.) Lastly, an Inductive argument, being grounded on principles that are sure and certain, is in itself, or essentially, a perfect demonstrative argument. Where there is question of a universal law of nature, the conclusion gained by induction from the given principle is only hypothetically certain; but under the specified conditions it is certain, and remains so as long as these conditions last; and this is quite enough. No one can reasonably doubt, for instance, that heat expands bodies, and that bodies specifically heavier than water sink in water, unless the action of some other law, or the direct interference of Divine Power cancels the conditions on which the uniformity of such laws depends.

To make our inductions valid, however, we must observe the following **rules**:

(*a*.) In reasoning from the individuals to the species, it is not sufficient to argue from a few instances; we must extend our inquiry so far at least as to make it embrace really representative members; otherwise we shall not have a sufficient basis for our argument.

(β.) Then we must be careful not to mistake merely accidental qualities for those that are essential, and so fall into a *fallacia accidentis*, which has been already explained.

(γ.) In reasoning from phenomena to a general law, our observation of the phenomena should be as wide as possible, and be followed by repeated and

various experiments. Observation and experiment are not in themselves Induction any more than they are Logic; but they are the necessary means by which certain premisses may be obtained for inductive reasoning.

(*δ.*) It is further necessary to ascertain whether the phenomena observed are uniform and unvarying effects of the action of the physical cause assigned to them. If exceptions to the rule occur, an inquirer should then get to know whether they are to be explained by other causes, and whether these causes modify or even nullify the law he is seeking to deduce from the phenomena. Exceptions, for which an obvious explanation can be given, do not weaken an inductive argument; but, when there is no satisfactory way of accounting for them, they of course render valueless the premisses against which they militate, and which consequently cannot form a certain basis from which a universal law may be inferred. Hence Logic forbids our using them in any argument that we put forward as demonstrative.

Now, if Logic has a right to do this, it is again evident that Induction must fall under its laws; and, if it falls under the laws of Logic, **Induction** must either implicitly or explicitly be **in logical form**; and the form of Logic we have shown to be the syllogism; hence Induction must itself be a syllogism either openly or in disguise.

(*a.*) To take, first of all, an example of perfect or complete induction. If I say: Mercury, Venus, the Earth, Mars, &c. (naming all the planets) receive light from the sun; therefore all planets receive light from the sun,—I am plainly enough using the

incomplete syllogism called an euthymeme, in which one premiss is suppressed, though understood; so that my argument can be thrown into regular syllogistic form thus:

Mercury, Venus, the Earth, &c. (naming the rest) receive light from the sun;

But all planets are Mercury, Venus, &c. (naming the rest);

Therefore all planets receive light from the sun.

This is a very good instance for illustrating the uselessness of complete induction; for, if I say that each planet individually gets light from the sun, I am only saying the same thing in different words when I state in the conclusion that all planets do so.

(*β*.) In Incomplete Induction, too, we are really reasoning from a suppressed premiss, viz., either from the proposition, that because certain quality is found in all the observed individuals of a species, it belongs to the species as such, *i.e.*, to the specific nature of the individuals; or from the kindred proposition, that because a certain phenomenon is always seen to result from the action of some physical cause, it must have its origin in the specific nature of that cause. What right we have to make use of these premisses, we shall see by recalling the explanation of the application to induction of the principles on which it rests; and that explanation will show us further that an induction is essentially dependent upon a middle term, and that, although we speak of reasoning from particulars to the universal, we are in point of fact reasoning from what is universal in those particulars back to its

reason or cause, as the case may be. Thus our argument, that because all the birds we know of have warm red blood, warm red blood is an essential property of all birds, implies the first of the proposed propositions as one of its premisses, implies consequently a middle term, implies moreover an argument from what is universal in the instances adduced to the reason from which it results, *e.g.*:

Because the quality of having warm red blood belongs to all known birds, it must be part of their specific nature;

But unknown birds have the same specific nature as known birds;

Therefore (according to the axiom, like reasons have like results), the quality of having warm red blood must belong to the unknown as well as to the known birds, *i.e.*, be a universal and essential property of the species.

Against the validity of incomplete Induction as a form of syllogising, it may be urged that it violates one of the most important rules to be observed in reasoning, viz., that the conclusion should not have greater extension than the premisses, *i.e.*, contain anything that is not in them. Now the species has greater extension than the individuals from which the specific quality is inferred, or—to speak more accurately—the specific quality considered either actually or potentially *per se* has greater extension than the instances of it known even to the widest experience; and the whole has greater extension than its parts; and the cause, as container, has greater extension than its effects, which are to it as things contained. How is the difficulty to be met?

Some logicians thought to manage it by adding to their enumeration, "and so of the rest," or "and so of every other," *e.g.*, This body is heavy; so is that one; and so is every other body; But this, and that, and every other body are all bodies; therefore all bodies are heavy. At best such a method is very unsatisfactory; for it strives to make the induction complete by means of a mere assumption, and then makes the conclusion nothing but an amended repetition of a very clumsy first premiss. But, if we choose one of the two propositions proposed at p. 131, to do duty for our missing premiss, we shall have in that premiss either the specific nature of the individuals, or the specific nature of the cause which produces certain effects, according to the requirements of our argument; and so shall not lay ourselves open to the objection that our conclusion has greater extension than our premisses. So much for the form of Induction, to which the definition of the syllogism[1] will be found to apply as strictly as to Deduction.

A word remains to be said of the **value and scope of Induction.**

Its scientific value is nothing less than enormous; for by it we come to know the essential characteristics of the species or classes to which observation extends; and by it, and by it alone, inasmuch as we arrive at the knowledge of universal laws by the conclusions drawn from the uniform recurrence of phenomena, can we discover the laws of physical nature. In the first case, it is one means of gaining correct ideas and giving correct definitions; in the

[1] See p. 32.

second case, it is the only means and the necessary means of establishing and pursuing and perfecting natural science. Witness the history—if we may so term it—of the discovery, the testing, and ultimate verification of the law of gravity.

The reasoning we are all of us, more or less unconsciously, going through during the day is, for the most part, nothing but induction and analogy and hypothesis, resulting from observation. A child reasons inductively when, from seeing snowdrops in many gardens every January since his powers of observation began to develope, he argues that it is a property of all snowdrops to flower early in the year. But statements which are the outcome of merely enumerative induction are usually temporary and liable to correction, for the obvious reason that they do not—according to the laws of valid induction—lead back to the cause or principle *viâ* the specific nature of the individuals enumerated. Hence, in our every-day reasoning, the proportion of the *bonâ fide* inductive element is small compared to that of hypothesis and analogy.

That Induction cannot be used to demonstrate matters of faith, we shall see later on; but it was yet to be noted here that it can have no application whatever to facts of the moral order, because any unvarying uniformity in such acts is impossible, for the reason that they are dependent not on a necessary, but on free rational causes; hence a universal law cannot be inferred from them. From any uniformity that is observable in facts of the moral order, we can only conclude—at the very most—that under certain circumstances or con-

ditions, people will usually act in one way, and not in any other. But from this we cannot further conclude with any kind of certainty, that some particular person will, under precisely these circumstances or conditions, act in the one way which we know to be usual; still less have we any right to conclude that he ought to do so.

Having now got some notion of the Demonstrative Argument, we must next take a little look at the Probable Argument, *i.e.*, an argument of which we prove the conclusion by some probable medium; for we often find that an argument adduced in support of a thesis has not the force of certainty but only of probability.

CHAPTER XII.

XXVI. Probable arguments.

XXVI. Probable Arguments are of three kinds, viz., of

(1) Analogy;
(2) Congruity;
(3) Hypothesis.

(1.) **Analogy.** In reasoning by analogy, we conclude that two or more objects, which either resemble or are unlike each other in several or many qualities, will probably resemble each other or else be unlike in some other qualities; and, applying this to causes, we infer that because two or more causes have many qualities in common, they will likewise have effects in common; and conversely that, if their

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The reasoning we are all of us, more or less unconsciously, going through during the day is, for the most part, nothing but induction and analogy and hypothesis, resulting from observation. A child reasons inductively when, from seeing snowdrops in many gardens every January since his powers of observation began to develope, he argues that it is a property of all snowdrops to flower early in the year. But statements which are the outcome of merely enumerative induction are usually temporary and liable to correction, for the obvious reason that they do not—according to the laws of valid induction—lead back to the cause or principle *viâ* the specific nature of the individuals enumerated. Hence, in our every-day reasoning, the proportion of the *bonâ fide* inductive element is small compared to that of hypothesis and analogy.

That Induction cannot be used to demonstrate matters of faith, we shall see later on; but it was yet to be noted here that it can have no application whatever to facts of the moral order, because any unvarying uniformity in such acts is impossible, for the reason that they are dependent not on a necessary, but on free rational causes; hence a universal law cannot be inferred from them. From any uniformity that is observable in facts of the moral order, we can only conclude—at the very most—that under certain circumstances or con-

ditions, people will usually act in one way, and not in any other. But from this we cannot further conclude with any kind of certainty, that some particular person will, under precisely these circumstances or conditions, act in the one way which we know to be usual; still less have we any right to conclude that he ought to do so.

Having now got some notion of the Demonstrative Argument, we must next take a little look at the Probable Argument, *i.e.*, an argument of which we prove the conclusion by some probable medium; for we often find that an argument adduced in support of a thesis has not the force of certainty but only of probability.

CHAPTER XII.

XXVI. Probable arguments.

XXVI. Probable Arguments are of three kinds, viz., of

(1) Analogy;
(2) Congruity;
(3) Hypothesis.

(1.) **Analogy.** In reasoning by analogy, we conclude that two or more objects, which either resemble or are unlike each other in several or many qualities will probably resemble each other or else be unlike in some other qualities; and, applying this to causes, we infer that because two or more causes have many qualities in common, they will likewise have effects in common; and conversely that, if their

qualities as causes are unlike, they will also differ in their effects. When, for instance, we conclude from the flattening of the earth at the poles, that our globe must originally have been a soft mass, we are reasoning analogically, because our argument is based on the analogy between our earth and any ball revolving on its own axis; the likeness between the two consisting in globular form and revolution round axis. Now, as such a ball revolving round its axis is not flattened at its poles unless it be soft, we infer that the earth must have been originally soft, for otherwise it would not be flattened at the poles. This example can be put into an experiment of twisting a ball of soft clay or dough rapidly round a cane, and then doing the same with a ball of worsted, or the hardest ball through which we can force the cane. Again, we are using an argument by analogy when we infer the attraction exercised by the sun upon the planets, from the influence of the earth upon the moon, or from the attraction exercised by the earth upon all bodies that come within its influence.

All such arguments are based on the axioms: "Similars agree with similars; dissimilars with dissimilars;" and, "Similar causes produce similar effects; dissimilar causes, dissimilar effects." Yet these axioms are not of universal application, nor are they verified in every case; hence they cannot form the basis of perfectly demonstrative arguments, but only of such as make the thesis for proof more or less probable. The greater, however, the similarity between the things compared, the higher is the degree of probability established, so that now

and then conclusions resting on analogy may even appear to amount to certainty. But as, generally speaking, this kind of argument produces nothing beyond probability, there is always something uncertain and unsatisfactory in endeavouring to establish a thesis solely by means of analogy. At least, in such a case, no sort of unconditional certainty can be claimed for the conclusion, though—as a matter of fact—this is too often done. To strengthen, or rather to tell out and give circumstantial cogency to a demonstrative argument, analogy may be very useful; but, in a general way, it has itself but little force; and is more effectually used to silence objections than to prove or discover truth. In the use of analogy, care must first of all be taken to ascertain that the similarity or dissimilarity between the things compared or contrasted, is a real, and not merely an apparent one; and during the argument the analogy must not be extended further than the actual relation between the things warrants.

Argument by analogy may be threefold, viz.:

(a.) **A pari**, when the relation between the things is one of simple similarity; *e.g.*, Fortitude is commendable; therefore, *a pari*, is temperance commendable. When the sun shines brightest, sensible vision is not the most distinct; therefore, *a pari*, in the sunshine of prosperity our intellectual vision is not the most piercing. And the parent used an argument *a pari* when, in consoling his children for their disappointment on hearing that it was impossible for the robins to have given a leafy covering to the *Children in the wood*, he told them that, as

somebody[1] describes himself, when he was a child fallen asleep in a desert wood, covered with leaves by the wood-pigeons that took pity on him, so might the dead brother and sister have been cared for by the pitying robins. And, as Cassandra in the streets of Troy was obliged to prophesy, although she knew no one would believe her, so *a pari* are preachers or writers sometimes obliged to address auditors or readers who, they know, will neither heed them nor believe.

(b.) **A fortiori,** when there is not merely similarity between the things compared, but when the points of similarity belong in a much higher degree to the thing we are arguing about than to that or those with which it is in analogy; *e.g.*, arguing from the greater to the less—an angel cannot create anything; therefore *a fortiori* man cannot do so: and, from the less to the greater—detraction is evil; therefore, *a fortiori*, calumny is evil. When, in his *Analogy of Religion*, chapter 5, Bishop Butler compares analogically the present life, as forming the proper preparation for another, to childhood as a preparation for manhood, he naturally draws out his argument *a fortiori*. Of the same nature was the argument suggested by the poet Coleridge in showing his weed-covered garden to Thelwall. It was the opinion of the latter that it would not be right to bias the mind of a child by instilling into it opinions before it should have arrived at an age to judge for itself. "I showed him my garden," said Coleridge, "and told him it was my botanical garden." "How so," he replied, "it is covered with weeds." "Oh!"

[1] Horace, *Od.* iii. 4.

rejoined the poet, "that is only because it has not yet come to its age of discretion and choice. The weeds, you see, have taken the liberty to grow, and I thought it unfair in me to prejudice the soil towards roses and strawberries."

(c.) **E contrario,** when the analogy is that of contrast or opposition; *e.g.*, virtue is praiseworthy; therefore, *e contrario*, vice is blameworthy. Energy of will is the life of the intellect; wherever it is, there is action and animation; therefore, *e contrario*, where it is not, all is listlessness, dulness, and desolation. Innocence gives ease and freedom to the mind; therefore, *e contrario*, guilt disquiets and fetters it. Generous appreciation of merit brightens the reputation upon which it breathes; jealous depreciation, *e contrario*, blasts and withers it.

(2.) **Congruity.** An argument from congruity is one which brings out with greater clearness the truth of a proposition (already proved in some other way), by showing how it agrees with or is *congruous* to other truths of which we have certain knowledge. This kind of argument cannot, under any circumstances, be used to prove the truth of a thesis in the first instance. It takes that for granted, for its office is only to show the consonance or harmony of the proposition with other truths, and thereby to bring *its* truth into bolder relief, and so make it clearer to the eye of reason. Hence, being insufficient to prove to demonstration a truth not yet established, arguments from congruity have *per se* only the value of probable arguments. Such, for instance, are all the arguments made use of to make the mysteries of Christianity acceptable

to reason, for they do not make the truth of the mystery certain to us to begin with. That has been done by Faith. They are only used to make the truth clearer to our minds. For the most part such arguments fall into some one of the classes of arguments from analogy.

(3.) **Hypothesis.** By hypothesis we understand some proposition, which we have gained neither from induction nor deduction, but have merely assumed, in order to explain by it certain phenomena, because we think they can be rightly deduced from it; or, more shortly, it is something not proved but assumed for the purpose of argument. But, because the basis of such an argument is merely conjectural, it has received the name of hypothesis, which is the Greek word for supposition.

Hence, it is evident that no hypothesis has any scientific value until it has been shown how and why the phenomena in question may be accounted for by it. But even then the hypothesis is only more or less probable; for it may happen that the same phenomena may be equally well accounted for by some counter hypothesis. When there are thus two hypotheses, one seemingly as good as the other, it is necessary to test them by some facts or things which will agree with one and not with the other, and thus increase the probabilities in favour of one of the two hypotheses. Such facts or things are called crucial instances, and the experiment in which they are thus applied is termed an *experimentum crucis*. Hence, to make any hypothesis certain, we must seek to place it on a further basis

of purely scientific principles. When its adequacy has been inductively tested by such principles, and it is found to offer the only satisfactory explanation of the phenomena, to the exclusion of every other hypothesis, we may come to regard it as certain, or as a law of nature. Such, for instance, are Newton's Law of Gravity, and the Copernican hypothesis of the movement of the earth round the sun. In the same category scientists would probably place the undulatory theory of light, the luminous ether which is the medium of its transmission, and the vibratory theory of sound, which were in the first instance brilliant conjectures, and have passed into the range of scientific facts only because they explain what, on any other hypothesis, known to us, is inexplicable. Their certainty, therefore, is at best only a sort of provisional certainty. The word *theory*, which has several various meanings, is in science applied to a well verified, though not necessarily perfectly verified hypothesis.

If any hypothesis is to be held sufficient for the basis of an argument, it should fulfil the following conditions:

(*α*.) it must not be intrinsically absurd or contradictory;

(*β*.) it must not be in contradiction with the established truths of experience, faith, or science;

(*γ*.) it must not seek to obviate the difficulties to which it gives rise, by means of fresh hypotheses;

(*δ*.) it must explain *all*, not merely *some* of the phenomena in question;

(*ε*.) lastly, it should only be adopted and applied,

when the cause or reason of the phenomena in question has not yet been, or perhaps cannot ever be ascertained by any scientific method.

CHAPTER XIII.

XXVII. Scientific knowledge. XXVIII. Object of scientific knowledge. XXIX. End of scientific knowledge.

XXVII. Science or Knowledge, or more exactly, **Scientific Knowledge,** "the result or outcome of demonstration," as it is called by St. Thomas[1] may be regarded either **subjectively** or **objectively.** In the first of these two aspects, *i.e.*, **subjectively,** it may mean either the cognitions we receive by means of the light of reason, and so be placed in contradistinction to the teachings of experience and faith; or it may signify only our cognition of the truth of a proposition by means of *mediate* reasoning; and, as the mediate light of reason depends on demonstration, knowledge is in this sense defined to be, "the certain cognition of an object, which is acquired by means of demonstration," Then—to quote St. Thomas again—as "Demonstration, which gives us knowledge of a thing, proceeds from its causes."[2] Scientific Knowledge must be closely defined as "a certain and evident cognition of the **causes** of the things known." These causes are of four kinds: (1.)

[1] In lib. i. *Poster.* lect. viii.
[2] Lib. i. *Sent.* dist. xlv. q. 1, a. 3. ad. 5.

efficient, *i.e.*, that which by its action produces the thing. (The word *action* specifies the efficient cause, and marks it off from all other causes); (2.) **material**, *i.e.*, that element in the thing, which is in itself undetermined, viz., matter, but is capable of being determined by another, *i.e.*, by the (3.) **formal** cause or form, which is that which determines matter, and so makes it what it is; (4.) **final**, *i.e.*, that which is aimed at by the efficient cause,—in other words, the end of an action. Thus, a sculptor is the efficient cause of a statue by his action in making it; the stone or marble he works upon, is the matter or material cause of the statue; the shape he gives to it, is its form or formal cause, and is that which *makes* a statue what it is; the end or motive he or his employer has in view, is the final cause of the statue. Viewed without reference to the statue, the stone or marble is, of course, a substance made up of matter and form; the components being the matter; their union or combination, the form; the physical action, which produced that union, the efficient cause, but a secondary efficient cause dependent on and acting directly by the power of God—the first and highest of all efficient causes. There is a great deal to be learned about causes; but this brief indication of their nature will perhaps suffice to make clearer the definition of Scientific Knowledge in its subjective aspect.

Objectively considered, Scientific Knowledge means the collection of ordered truths within a given sphere acquired by demonstration, and *so* known and ordered according to their causes and laws. When we know some few isolated facts or

phenomena in their causes, we may, of course, be said to have a scientific knowledge of them as units; but this does not form Scientific Knowledge as a whole. That can only be attained by placing such known units in their right relations to each other, and so forming them into a united order, developed from and dependent upon some central point of union. This must necessarily be the first principle of a science; and the order dependent upon it, is called a system. Hence Science, or Scientific Knowledge as such, is essentially system, and consequently its essential form must be systematic; for, where there is no system, there can be no science or Scientific Knowledge. Now we can understand why it is called the result of method; for, in forming a system, the first thing to be done is to define the whole and its parts; the next is to make a right division; the next after that is to prove or establish the parts or separate truths, and either to lead them up to, or else deduce them from their first principle.

To sum up: Science or Scientific Knowledge is considered subjectively when regarded as an accidental quality inhering in the person possessing it; objectively, when it represents the objects of such cognition. Hence, as St. Thomas says, "there are three, and three only requisites for science; viz., the active faculty of the thinker by which he judges of things, the thing thought and the union of the two,"[3] *i.e.*, A subjective intellect, an objective fact or truth, and the representation of that truth in the intellect.

The truth or accuracy of a scientific system

[3] *De Verit.* q. 11. a. 1, b. 3.

depends naturally on a number of **conditions or rules**, of which the following are the chief:

(a.) First and most important of all, the first principle, on which the whole system depends, must be true, and true as the first principle of the science built up thereon; otherwise the whole system will be wrong, Hegel's first principle, for instance, *i.e*, that thought and being are identical in idea, makes his whole system false.

(b.) We must start from the right point, and use the right method. This we should not do, if, in philosophy for instance, we began from the point—which in fact is an utterly pointless one—of universal doubt; and if we applied deduction and *a priori* arguments to natural science. Thus we should make both the whole as such and all its parts utterly wrong.

(c.) The laws and rules of Definition, Division, and Demonstration or Argument, must not be violated either with regard to the whole or its parts; or else there will be plenty of flaws in the system.

(d.) Every part of the system must be kept in its natural place, *i.e.*, in that by means of which it is in its right relation to the other parts. This is of the very essence of division; and consequent upon it is the caution to avoid digressions. What confusion we should introduce into Logic, for instance, if in treating it synthetically, we studied all about the syllogism before we had learned anything about propositions. And if, in speaking of nominal definitions, we had digressed into a treatise on derivation, how completely out of proportion would that part of the

text-book have been with the other parts, and so with the whole.

(e.) Every part of the system must be set forth with the proofs corresponding to and necessary for it; and nothing needing proof must be admitted there without proof. To this rule, however, every *lemma* is an exception. A lemma is something borrowed from another science, and assumed to be true on its authority. Though, as we use it, it may need proof, we are not obliged to give it; for we have a right to suppose that it has been verified in the science to which it belongs.

(f.) Consequences, which follow immediately from the ascertained chief principles of a system, may be immediately added to them as corollaries, in order to bind together things that are closely interconnected. Corollaries are evident, or at all events practically evident consequences, in which the deduction is so apparent that proof of them is considered unnecessary.

Having seen the conditions upon which the truth of a system depends, we shall be prepared to look at two other things regarding Science or Scientific Knowledge; viz., its Object, and its End.

XXVIII. Object of Science or Scientific Knowledge. Every Science has its determined object, *i.e.*, that about which it treats; and this object may be either **material or formal.** The **Material Object** indicates the matter of the Science considered generically; the **Formal Object** is that particular part or aspect of the Material Object, which the Science professedly contemplates, and which forms its adequate and distinctive "subject-

matter." Hence, it may happen that several Sciences have the same Material Object; yet, as they all regard it under a different aspect, or are specifically given to distinct parts of it, their respective Formal Objects are quite distinct. Thus *man* is the material object of medicine, anatomy, ethics, physiology, etc.; but *man* as a free moral being, tending by his free-will to his constituted end, is the formal object only of ethics.

From this it will be seen that the material object of a Science designates its class; while the formal object specifies the Science, and so differentiates it from all other members of its class. Furthermore, the object—and usually the material object—indicates the degree of superiority or inferiority of a science in the catalogue of the sciences, *i.e.*, their **sub,** or **super-ordination** with respect to one another. Thus experimental are subordinate to mental sciences; and of two experimental sciences that one ranks higher whose object approaches more nearly to the suprasensible, *e.g.*, language as the immediate expression of thought is higher than physical science; while among mental sciences the speculative rank higher than the purely formal, *e.g.*, Philosophy is superordinate to mathematics; and at the summit of Philosophy, and so of all sciences, stands the science of Metaphysics, because it has to do with those things which are most of all others intelligible, *i.e.*, being and those things which follow from being, whence its name of Metaphysics, *i.e.*, beyond physics; the first causes of things, whence it is called First Philosophy; God and the intelligences, whence it is termed the

Divine Science. (See the *Proœmium* to St. Thomas' Commentary on Aristotle's Series of Treatises on Metaphysics). In Metaphysics then we find the watch-tower to which Bacon refers, when he tells us that, if we would grasp and understand any particular science, we should not "stand on a level with it, but climb up, as it were, into the watch-tower of some other science," and thus place ourselves in a position to take in all its parts.[4]

In speaking thus of the subordination of the sciences, and claiming the presidency for Metaphysics, it must be understood that we have only in view the sciences acquired by processes of reason. Dogmatic Theology, which is in its very nature paramount, belongs to an altogether different order; and, though it cannot run counter to science, has an object, a basis, and a source altogether different from those of science.

Quite distinct from the Subordination of the Sciences, which implies no interconnection whatever, is the **Subalternation** of Sciences, which consists in the fundamental dependence of some sciences on, and hence of their inferiority to others. This takes place when a science, having no axiomatic or self-evident truths for its first principles, borrows principles from some higher science, called the subalternant or governing science in reference to the inferior of subalternate. They are taken for granted by the lower, because they are scientifically proved by the higher science. Thus perspective and music borrow their first principles from the higher science of mathematics. Where such dependence exists,

4 *De. Aug. Scient.*, Works, vol. i. p. 460, ed. 1857.

the material object of both sciences is the same; but in the inferior science a certain difference is added, which suffices to constitute a specially distinct formal object; *e.g.*, *number* forms part of the formal object of mathematics, *sounded number* is the formal object of music. In like manner, the *line* enters into the formal object of mathematics; the *visual line* is the formal object of perspective.

XXIX. End of Knowledge, or Science. Primarily, the end of science can be nothing else but the attainment of Truth, and this should always be its first and highest aim. It is sometimes called the **theoretic**, in contradistinction to the secondary end, which is distinguished as **practical**, and consists in the endeavour to further the interests either eternal or temporal of mankind,—an endeavour which cannot be realized by science except through the realization of its primary end, *i.e.*, the attainment of Truth. Equally true is this of what, consonantly, to the distinction between the subjective and objective aspects of Scientific Knowledge, may be called its **subjective** end, which has been apophthegmatically expressed in the saying that "Philosophical, or Scientific Knowledge is its own end," a proposition developed in Cardinal Newman's sixth discourse on the Nature and Scope of University Education. The reason has its foundation in our very nature; and, according to Aristotle, is threefold. First, because everything naturally desires its own perfection; and hence the intellect being *in potentia* with regard to knowledge, and being only brought into act by its means, naturally deserves it. Secondly, because everything has a natural inclination towards

its proper operation; and hence, as the operation proper to the intellect is to understand and reason, man is naturally drawn to understand, and consequently to know. Thirdly, because everything seeks to be united with its principle; and man is not united to the principles of human intelligence save by means of intellect. Hence it is not vain to seek science for its own sake apart from utility, for a natural desire cannot be in vain; and its realization satisfies an actual need of our nature. We all remember the line: "*Felix* qui potuit rerum cognoscere *causas*." Here we have subjective scientific knowledge and its subjective end; while both the one and the other connote *that*, without which they would at once cease to be, viz., Truth and Certainty; and so we come at last to the **End of the Act of the Agent**, or **Material Logic.**

C.

THE END OF THE ACT OF THE AGENT,

OR

MATERIAL LOGIC.

CHAPTER I.

I. Material truth of thought. II. Relations of the mind to Truth, viz., Ignorance, Doubt, Opinion, Certainty. III. Kinds of Certainty.

In tracing the plan of this little work, we saw that the end of the act of the agent in logic consists in the **attainment of truth and certainty**; and so, in treating of that end, we have to consider:

I. What the material truth of thought is, and what error is.

II. The fourfold relation in which our minds may stand in regard to Truth, viz., Ignorance, Doubt, Opinion, and Certainty.

III. The Kinds of Certainty.

IV. The Sources of Knowledge, as means of attaining Truth, and as motives of Certainty.

V. The Criterion of Truth and Principle of Certainty.

VI. The Laws or Rules on which depends the Material Truth of thought.

I. Material Truth of Thought. As distinguished from the Formal Truth of Thought, which consists in the conformity of the thought with the formal laws of thought, and so is sometimes called "Logical Truth," Material Truth is defined, "the **conformity** of the mind with the object," or, to

put it more closely, the conformity of the judgment formed by the intellect with the object of such judgment, *i.e.*, a correspondence between the representative thought and the represented object. Hence its name of **Conceptual Truth** in contradistinction to purely Logical Truth; while both are essentially Subjective Truth, *i.e.*, Truth existing in the mind of the thinker. It is obvious that Conceptual or Material Truth does not require an exhaustive representation of the object of Thought, and certainly does not suppose any full knowledge of, or absolute resemblance to it. This would be utterly impossible to such limited cognitions as ours must be in this life. All that is needed is, that what we know of the object should actually correspond to it; just as a photograph corresponds to the person it represents, though it does not show the whole of the person, nor is there any absolute resemblance between the glass or paper bearing the portrait, and the flesh and blood of the person.

Material Error, as opposed to Material Truth, consists therefore in a want of correspondence between the object as it really exists and as the mind conceives it to exist, *i.e.*, between the judgment of the intellect upon the object and the object itself; hence in a **difformity** between the thought and its object; but not in the incompleteness of the thought.

From this it will be evident that Material Truth belongs primarily to the judgment pronounced by the mind in joining together ideas, not in the inadequate representation of the object

in the first instance; for until some sort of judgment has been formed, the thought cannot yet be said to be either conformable to the external object, or wanting in such conformity. And it is the same with error, which resides in the judgment, and not in simple apprehension. The reason is this. Material or Conceptual Truth consists, as we have seen, in a conformity—hence an equation—between the intellect and its object. But conformity is not identity, because an equality of *distinct* things; hence there must be a difference between the representing thought and the represented object. In simple apprehension there is no such distinction discoverable, for the concept is merely an intellectual transcript of the original; hence there is identity between the representation and the represented. Not so in judgment or statement, which, as judgment, has no counterpart in the thing represented, in which there is no separation, while in a judgment there is the separation into subject and predicate, and there is also the copulative verb *to be*, which is altogether excluded from the object represented. Hence a conformity or equation is possible, because there is a distinction. This explains too why error is called "Assent to a false proposition," or "Dissent from a true one;" assent and dissent essentially implying a judgment of the mind.

As conceptual Truth resides primarily in the judgments of the intellect, as the judgments of the intellect are of many kinds, and, being acts, are differentiated by their object, it follows

that there are many classes of conceptual truths. Chief among them are the following:

(1.) **Truths supra-rational and rational.** Rational truths are such as we come to know either immediately or mediately by means of reason, and in the latter case are able to prove by argument. Supra-rational truths, on the contrary, are such as we could never know either immediately or mediately by the light of reason, nor prove to demonstration by its principles when we have obtained the knowledge of them by means of Revelation. Who can know from reason, or give demonstrative proof, for instance, that God while one in essence is three in Person? But it is an immediate truth of reason that a thing cannot be and not be in the same relation; and the rational truth that God exists admits of strict syllogistic proof. We may here draw attention to the distinction between judgments that are **according to reason** and those that are **contrary to reason.** Of these the first-named are in accordance with rational principles and truths, while the second are in direct contradiction to them; *e.g.*, a circle is identical with a triangle; a part is larger than its whole. Now what is contrary to reason can never be true. Supra-rational truths, consequently, must be according to reason. They are so either negatively or positively; negatively when it can be demonstratively proved that they are not in contradiction with rational principles and truths; positively when, by arguments from congruity, they can be shown to be in actual harmony with rational truths.

(2.) **Truths necessary and contingent.** Neces-

sary truths are propositions whose contradictory cannot possibly be true. They are absolutely necessary when this contradictory can be true under no condition whatever; *e.g.*, there is no effect without a cause; they are hypothetically necessary when the truth of the contradictory is impossible only under certain conditions, *e.g.*, man cannot live without air, because God has made it a condition of his physical life. Contingent truths, on the other hand, are propositions whose contradictory, considered simply in itself, might be true; *e.g.*, the world exists, because the world, as contingent, might at any moment cease to exist.

(3.) Truths a priori and a posteriori. Propositions of which we have only to know and compare the component terms, in order to recognize their truth, are called *a priori* truths, *e.g.*, the whole is greater than one of its parts. Such truths are as such always universal and necessary. Propositions for which we require some further reason than this comparison of terms, in order to recognize their truth, are called *a posteriori* truths, *e.g.*, heat extends bodies. These truths may be universal and necessary; but they are not always so; *e.g.*, this blotting-paper is pink, is both singular and contingent; and the universal proposition, Heat extends bodies, is only hypothetically necessary.

(4.) Truths analytic and synthetic. In an analytic truth the predicate attributed to the subject is virtually contained in the concept of the subject, *e.g.*, a circle is round: in a synthetic truth the predicate lies beyond the concept of the subject, and hence the reason why the predicate

is attributed to it cannot be sought for in the subject itself, *e.g.*, the earth moves round the sun.

(5.) **Truths ideal and experimental.** In the former the matter of the truth is suprasensible, *e.g.*, God is eternal Wisdom; in the latter it is gained by means of immediate experience, *e.g.*, boys are noisy, some old people are fidgetty.

(6.) **Truths mathematical, physical, and metaphysical.** Mathematical, *i.e.*, a proposition relating to a mathematical quantity or power, *e.g.*, twice three are six; physical, *i.e.*, a proposition expressing some physical law, *e.g.*, a body at rest remains at rest until set in motion; metaphysical, *i.e.*, a proposition referring to the ultimate reasons or first causes of being, *e.g.*, the human soul is a spiritual being.

7. **Truths moral and religious.** The matter of a moral truth relates to the moral order; the matter of a religious truth relates to the religious order; *e.g.*, we must be just to all men, is a moral truth; we must honour God, is a religious truth.

(8.) **Truths theoretical and practical.** Theoretic truths refer to being as such, *e.g.*, every effect has a cause; practical truths relate to action, *e.g.*, charity to others is a virtue to be cultivated.

These various classes of truths form the principal matter of our cognitions; and from them we pass on by a natural transition, to consider the

II. Attitudes of the mind with respect to Truth. The relation in which our minds stand with regard to Truth is a fourfold one, viz.:

(1.) Ignorance;

(2.) Doubt;

(3.) Opinion;
(4.) Certainty.

(1.) **Ignorance,** or complete absence of any knowledge of a truth, is clearly enough not a positive, but a merely negative relation of the mind towards truth; or, more exactly, no relation whatever, but the absence of such relation. It is universal until the faculties of cognition in man become active; and after that it is in every mind partial, for it is impossible to know all truths, and we must necessarily be in ignorance of those of which we know nothing.

(2.) **Doubt** is either objective or subjective; **objective** when it is in the proposition, *i.e.*, when a proposition is based on grounds which do not exclude the possibility of its contradictory, and so which prevent the proposition itself from being received as a demonstrated truth. **Subjective,** or mental doubt, is the state our minds are in when we cannot choose between two contradictory propositions, because *to us* the reasons adduced for neither of them exclude the possibility of their contradictory; hence it is called, a state of mind in which we suspend assent for fear of falling into error. "This takes place," says St. Thomas, "either because the mind sees no reason for assenting to either contradictory; or because the reasons for assenting to both appear to be of equal weight." [1] In the first case the doubt is **negative**; in the second, it is **positive.** To both applies St. Bonaventure's description of doubt, viz., "the indifference of the judgment to two contradictories, so that it chooses

[1] *De. Ver.* q. xvi.

neither in preference to the other."[2] The terms **reasonable** and **unreasonable** doubt speak for themselves.

(3.) **Opinion,** like doubt, can be considered either objectively or subjectively. Taken **objectively,** an opinion is some proposition, for the truth of which there are sufficiently weighty grounds to induce an upright sensible man to accept it as true, though all possibility of the truth of its contradictory is not excluded. **Subjectively** considered, opinion is the state of mind we are in with regard to such a proposition. We hold it to be true, because we think the reasons which go to prove its truth are sufficient to do so; but we are not quite free from the fear that its contradictory may turn out to be true. Whence such a mental state may be called—an assent of the intellect to one of two contradictories, yet with the fear that the one not assented to may be true; or, as St. Thomas puts it[3] "that state in which the mind adheres to one side of the question, yet with fear of the opposite." It adheres to one side, either because it sees the reasons for that side only, or because—seeing the reasons for both sides—it holds that they are more cogent for one than for the other. Yet it fears the opposite, because the reasons, in both cases, are not such as to produce steady unqualified assent to the proposition. Examples of this are constantly met with in persons whose struggles with their opinions keep them out of the Church long after they have felt the insecurity of their position as heretics or non-believers. Their

[2] In lib. iii. *Sent.* dist. xvi.
[3] 2a. 2æ, q. ii, a. i, c.

belief in their own system has come to be a mere opinion joined to a very real fear that what is attracting both heart and intellect to the Church may be true. And then, when they reach the stage preceding the conviction which in most cases of conversion goes before and prepares the way for the gift of Faith, the position of their opinion is sometimes reversed. They think they see sufficient reason for joining the Church, but fear that what they are leaving may after all prove to be true. That there should be many degrees of probability in opinions, is of course natural and necessary; and it is only rational to accept a more probable opinion on any matter in preference to one less probable. Objectively, the degree of probability attaching to an opinion, depends upon the force of its sustaining reasons *per se;* subjectively, it depends upon the mind's apprehension and acceptance of those reasons; hence our expressions, that opinion *commends itself to me* as highly probable, I have *strong reasons* for holding this opinion, etc.

(4.) Lastly, we come to **Certainty,** which is **objective** as a quality of propositions, and subjective as a state of the human mind. A proposition is objectively certain when the reasons adduced for its truth exclude the possibility of its contradictory. Hence objective certainty must be synonymous with Truth, or rather what is *per se* certain must be true. **Subjective** certainty or certitude (which is the primary signification of certainty) is a term with two meanings. Strictly speaking, it is an attitude of the mind towards Truth, and hence may be defined the firm adhesion of the mind to a *true* proposition

without fear of error. Hence again subjective certainty is in this restricted sense necessarily conjoined with truth. But subjective certainty in its wider sense is that mental act or state of mind in which we are free from doubt, and firmly adhere to the object of our mental act; or, more shortly, a firm adhesion of the mind to its object without any fear of error; and that object is distinctly specified by St. Thomas when he defines certainty as "that state of the mind, in which it adheres to any judgment without fear of its opposite."[4]

Subjective certainty is therefore, in this wider sense, evidently neither synonymous with, nor by any means always conjoined with truth, for the patent reason that it is an adhesion of the mind to what is, in its very nature, fallible. Supposing someone were to call this in question, and to say that we cannot be subjectively certain of what is not true, we can answer him thus: Our proposition, that subjective certainty is not necessarily conjoined with truth, is either true or false; supposing it for the sake of argument to be false, our subjective certainty that it is true would prove it to be true, because we adhere to the judgment, of which the proposition is the sign, without any fear of error. Examples of adhesion to false judgments might be multipled *ad infinitum;* and our own daily experience proves only too surely that we are subjectively certain, *i.e.*, internally sure we are right, when we are actually very wrong indeed. Such adhesion to false propositions may be called a false assurance of certainty in con-

4 In lib. iii. *Sent.* disp. xxvi.

tradistinction to subjective certainty strictly so called, which necessarily connotes truth.

That ignorance, doubt, and opinion are, like certainty in its wide meaning, attitudes of the mind with respect to error as well as to truth, is almost too obvious to call for mention; but it may be useful to advert to the reason, which is that conceptual truth, of which alone we are now treating, resides in the judgment, and so does error. Ignorance of error speaks for itself; as there are many truths of which I am not cognizant, so too is my mind a blank with regard to many errors. And when, in doubt, we are placed between two contradictories, and suspend assent for fear of falling into error, we are in a neutral if not negative position with regard to each contradictory, and of two contradictories we know that one must be false. Opinion likewise, considered subjectively, inclines to error as well as to truth, either because we are blind to the reasons for the true proposition, and think we have reasons for its opposite; or because in weighing the reasons for each of the opposite opinions, personal motives incline us to accept as genuine the fictitious cogency of reasons for holding a false opinion. If experience proves that assurance of certitude can attach itself to erroneous judgments, much more, from the very nature of the case, is opinion likely to be sometimes allied with error. We pass next to consider the different

III. Kinds of Certainty. We have seen that Certainty, though fundamentally subjective, is often applied in a secondary sense to the object of certitude; *e.g.*, nothing is more common in ordinary conversation than the expression, "You may take that

for a certain fact," and other similar phrases. Considered **objectively** then, Certainty is **absolute** when a proposition is unconditionally certain and unconditionally excludes its contradictory; **hypothetical,** when a proposition is only conditionally certain, and so only excludes its contradictory under certain conditions. Further, objective certainty is **metaphysical** when the contradictory of the certain proposition is intrinsically impossible because involving an intrinsic contradiction, *e.g.*, the whole is greater than its parts, is metaphysically certain because its contradictory is intrinsically impossible; hence a proposition that is metaphysically certain is unconditioned and necessary. A proposition is **physically** certain when its contradictory is physically impossible, because opposed to the laws of nature, which are conditioned by the will of God; and a proposition is **morally** certain when its contradictory is morally impossible because opposed to the general and constant experience of mankind, which is conditioned by the will of God remotely, and by the will of man proximately. So much for Certainty as a quality of propositions. We have now to regard it **subjectively,** that is to say, as a quality of the mind, or **as Certitude.**

Passing by, as already sufficiently exlpained, the distinction between true and false certainty, we find that subjective, like objective certainty, may be:

(1.) (a.) Metaphysical; (b.) Physical;
(c.) Moral. Moreover, it may be:
(2.) (a.) Natural; (b.) Scientific:
(3.) (a.) Natural; (b.) Supernatural.

(1.) The internal conviction that we are right may have three separate bases, viz.:

(a.) I may think that the contradictory of the proposition I hold to be true, is absolutely and wholly false, as opposed to the very nature of things; and then I have **metaphysical certainty,** which is unconditioned, and admits of no exception. I am metaphysically certain that a just man cannot at the same time be unjust, that men are rational animals, that a whole is greater than one of its parts, etc.

(b.) Or I may think that the contradictory of my proposition is false because opposed to the laws of nature, *i.e.*, of external material nature; and then my **certainty** is **physical,** and conditioned by the First Cause of those laws, *i.e.*, by God Himself, Who can interrupt their uniform course either directly, as He does in miracles, or indirectly by the counter-action of some other natural law. Thus, when General Gordon was in the Soudan, I was physically certain that he was not at the same time in St. Louis; though, if he had had the miraculous gift of bilocation, he might have been in both places at once. And the son of Tobias was physically certain that the person with whom he was travelling was a mortal, and he had no apprehension of the contrary, although the person was really an angel in human form.

(c.) Or I may think that the contradictory of my proposition is false because the whole experience of mankind is against it, or because such things never do happen (though they might do), or because it is improbable, so utterly improbable

as to amount in practice to impossibility; and then I have a **moral certainty,** conditioned not merely by the Divine, but also by the human will, and so not free from exceptions. In actual usage the term Moral Certainty is generally taken to mean the highest degree of probability, and so propositions are called certain, which are in point of fact merely opinions, though opinions for which there is every sort of probability. This is one of many instances in which the boundary-line between two kinds of mental acts is so exceedingly fine, that it is hard to tell when it has been overpassed. But I am morally certain, in the real signification of the term, that the Turkish army is not at present landing on the coast of England, and that the English will not willingly yield Gibraltar, though there is nothing either in the nature of things or in the physical laws of the world to make me think either proposition impossible.

This examination of its separate bases points clearly to the conclusion that subjective certainty must admit of degrees; yet degrees may at first sight appear incompatible with the nature indicated by its definition. This incompatibility, even if apparent, is not real. Recalling the definition of Subjective Certainty in its wide meaning, viz., a firm adhesion of the mind to its object without any fear of error, we see that there is in it a double element—a negative and a positive element. The negative element consists in the exclusion of all fear of error; and in this point lies the essential distinction between certainty and opinion. So far as this negative element is concerned, we cannot

allow of degrees. There is either fear of error or there is not. If there is the slightest such fear, certainty is impossible. But there is a positive element in the definition, viz., the adhesion of the mind to its object. Now here we can, and we *must* admit of degrees; for, if what has been advanced regarding the bases of certainty be true, the adhesion of the mind must be firmer or less firm according to the force of the motive for such adhesion. No one will question that the force of the motive is stronger in metaphysical than in physical, and stronger in physical than in moral certainty; and so the order of degrees speaks for itself.

(2.) Further Subjective Certainty may be natural, or scientific. It is

(a.) **Natural** when we are sure of a thing without having gone through a scientific proof of its truth; *e.g.*, I am naturally certain that the fire which is roaring up the chimney when I come downstairs must have been laid in good time in the morning; I am naturally certain that, if it is a fine afternoon, I shall go out and play cricket.

(b.) **Scientific,** or, as it is sometimes called, Philosophic Certainty, is the kind of certainty we have of a proposition of which we have demonstrated the truth by argument, *e.g.*, Brownson had a scientific certainty of the existence of God when he had proved the truth of this proposition to his own mind by means of argument.

(3.) Natural Certainty has another meaning again, in contradistinction—that is to say—with supernatural. Certainty is

(a.) **Natural** when it is based on natural grounds or motives, or on natural evidence (of which more will be said later on);

(b.) **Supernatural,** when it is based upon a supernatural motive, *i.e.*, the veracity of God Who reveals Himself to us; or upon a supernatural principle, viz., the supernatural light of the gift of faith.

Obviously enough, natural, as opposed to supernatural certainty, and as including the various other kinds of certainty enumerated, is the aspect of the subject of which we are primarily treating; and, as Natural Certainty is based on natural grounds or motives, and is dependent upon natural conditions, they must form the next point of our inquiry.

CHAPTER II.

IV. Sources of Knowledge as media of Truth and motives of Certainty.

IV. Sources of Knowledge, as **Means of attaining Truth,** and as **Motives of Certainty.** A source of knowledge, in general, is that by which, on the one hand, we come to know a truth; and, on the other hand, that by means of which we are certain of the truth we have come to know. Hence the sources of knowledge have a double character and a twofold signification. In their first aspect, as they give us the knowledge of Truth, they are means or more properly *media* of knowledge, and organs or channels through which we know its truth; hence their name of criteria of Truth *per quod, i.e.,* instruments by

which we gain Truth. This use of the word "Criterion per quod" must not be confounded with the "Criterion secundum quod," which is the Criterion of Truth properly so called, and will be treated of in the next article. In their second aspect, the Sources of Knowledge, by guaranteeing its truth, and as conditions of its certainty, are the motives upon which we base our certainty of the truths they have communicated to us. This will be made clear by looking at these sources of knowledge separately.

As all our knowledge comes to us through Experience, Reason, and Authority, these must consequently be its three main sources, and the motives upon which all certainty depends. Now

(1.) Experience is twofold, viz.:

(a.) Internal, in self-consciousness;

(b.) External, by means of the external senses:

(2.) Reason, in the wide meaning of the term, acts

(a.) on the one hand intuitively and discursively;

(b.) and, on the other, in what is called "common sense:"

(3.) Authority finally is either

(a.) human; or

(b.) divine.

This gives us in all six sources of knowledge, six channels of truth, six guarantees or conditions of Certainty, which have now to be examined as such. Thus, we shall have first to take each source of knowledge briefly considered in itself as such; next we shall have to ascertain the periphery or extent of the truths we get to know

by its means; after that, we must see how and under what conditions it guarantees the truth of the knowledge it conveys; and lastly, we must show how it is a motive for our certainty regarding such knowledge. We shall see, as we go on, that the proofs adduced have neither the value nor the meaning of real demonstration, which, moreover, is itself a source of knowledge (reason acting discursively), and so cannot serve as a proof of the rest without making the argument either a vicious circle, or begging the question. What has to be done is to show, or rather to explain to what extent the sources of knowledge cannot deceive us under certain given conditions, and thus to make the natural certainty we have of their trustworthiness clear to our own minds, *i.e.*, to make it into a scientific certainty, which is still, be it remembered, natural in contradistinction to supernatural.

Experience.

(a.) **Internal experience, or self-consciousness.** In describing the way in which we form ideas,[1] mention was made of the "sensus intimus," which is the faculty by means of which we know (are conscious of) the internal acts of our physical life both in the sensible and intellectual order, and consequently know both our personal identity and personal existence. The action of this faculty obviously results in self-consciousness, by which we reflect on the first perception of our internal acts, and so become conscious of such perception.

The **truths** we get to know by this means are:

[1] See pp. 10, 11.

(*a.*) internal acts whether sensible or intellectual, *i.e.*, the acts that take place *hic et nunc* within us; not past acts that we recall by means of memory, nor the causes of the present internal acts;

(*β.*) personal identity and personal existence. I know that I exist because I am conscious of myself as a real personal being; and this is the only means by which I possess this knowledge.

As to the **certainty** or **trustworthiness** of this source of knowledge, it does not admit of doubt to any reasonable mind. To such a mind there can be no error or deception in the matter; and the impossibility of such deception is not difficult to explain:

(*a.*) I cannot doubt the certainty of the testimony of my consciousness without at the same time admitting it by the act of doubt; for, if I doubt my existence, for instance, I admit by this very doubt that I exist, for unless I existed I could not doubt. In doubting I presuppose thought, for without thought I could not doubt, and without existence I could not think.

(*β.*) There can only be deception where the known is really different from that which knows. There are many reasons why I may not always apprehend objects distinct from myself, as they really are; but, supposing that men have the use of reason, it is inconceivable that there should be deception where the things known and knowing are in fact one and the same, as in the case of self-consciousness, self being conscious of self.

(b.) **External experience,** by means of the **external senses.** External experience depends upon

the external sense, or sensation, a faculty which hands into our minds the report of the external senses about the qualities or phenomena of which their organs have received the impression.

The **objects** of which we have knowledge by means of sensation are:

(*a.*) External qualities and phenomena of bodies;

(*β.*) rest and motion of bodies;

(*γ.*) the existence of bodies. Only by means of the external senses can we know that bodies exist outside of us. But it must be noted that we only know these external facts by means of sensation in the *relation* in which they stand to us as sentient beings, and according to the impression they thus produce upon us. Hence the appearance of an object depends upon the state of the sense which perceives it, and upon the way in which we apply the sense to it. If, owing to illness or any other cause, a sense is in an abnormal condition, the impression it hands in to be transferred to the imagination as a picture, will be a false one, *i.e.*, it will not correspond to the object it tries to represent. *e.g.*, to the jaundiced all things look yellow; to the deaf clear sounds come confusedly. And a false impression will be produced too if the sense is not attentively applied to its object.

Hence the **trustworthiness** of the senses as sources of knowledge **depends upon certain conditions,** which belong partly to the sense itself, and partly to the judgment formed concerning the object perceived, and based upon its sensible perception. Those which relate to the **sense** are:

(*a.*) The object must be in a right relation to the

sense; *e.g.*—with respect to the eye—it must be neither too near nor too far away, or a too strong or too weak impression will be produced, and lead to deception. Then the medium between the sense and the object must be a congruous one, so that it may not hinder a correct perception. No one, for instance, would put on blue glasses in examining an oil painting, or wear gloves in feeling a person's pulse.

(*β.*) The sense must be sound and in a normal condition, if it is to tell the truth; *e.g.*, a short-sighted person will not see much of the fan-tracery vaulting in Gloucester Cathedral; his defective sight will only take in an indistinct inaccurate impression, unless he remedies the defect by wearing spectacles.

(*γ.*) The application of the sense to the object must be attentive. A cursory glance at Bath Abbey Church, for instance, will not give me a distinctive and so a correct impression of it.

With regard to the **judgment** passed on the object of sense:

(*a.*) We should not judge of an object, nor attribute any quality to it, until we have ascertained that all the necessary conditions for ensuring the trustworthiness of the sense are fulfilled.

(*β.*) We must not extend the scope of the perception of sense beyond its natural limits, *i.e.*, as the senses only perceive the external qualities and phenomena of objects, we cannot, merely from such perception, judge of anything which it does not comprise, *e.g.*, of the nature of the object, or of qualities in it which do not fall under the senses. It is true that further inquiries on such points are

based on the immediate perceptions of sense, but they do not form part of it.

(γ.) Lastly, we must be careful not to consider a sensible quality *as such* to be an essential quality of a body, though it may sometimes prove on investigation to be so; nor should mere appearances be taken for realities until verified as such.

But, above all, sense must be under the control of reason, which has to give to the perceptions of sense their right value and their true signification, and at times to act as their necessary corrective. When this control is neglected, there is sure to be danger of deception by the senses, though its cause is not to be laid solely at their door, but rather must be attributed to reason when she judges of the object of sensation without observing the conditions upon which depends the truth of her judgment.

Taking these conditions for granted, however, the accuracy and **trustworthiness** of the certainty given by the senses, admits of no reasonable doubt; because—

(*a.*) If, under such conditions, the senses could deceive, the cause of the deception would lie in the sensible perceptive faculty itself, which would thus *by its very nature* fail to answer its end. But this cannot be, for every natural faculty is proportioned to its natural end, and must attain it, if no obstacles are placed in its way, and if it acts in the right manner.

(β.) The same principle applies to the judgment formed on the testimony of the senses. If it is limited to the exact objects of their perception, it cannot deceive, unless on the supposition that the

faculty of judgment does not answer its end, and so by its very nature implies deception, which is obviously absurd; *e.g.*, when I state, on the authority of my senses, that I am writing with black ink on white paper, that there is a cart rumbling in the distance, that someone is scratching away with an unmended quill within a few yards of me, I cannot be deceived if I observe the conditions required in forming all these judgments.

(γ.) The universal belief of mankind, with the exception of some few crotchet-nurses, does not admit of the least doubt of the trustworthiness of the perception of the external senses; indeed people have no surer ground for their certainty concerning acts perceptible to sense, than that they have themselves seen or heard them done.

(2.) **Reason.** By means of reason, considered as a source of knowledge, we obtain knowledge of what lies beyond immediate sensible experience, and is in this sense supra-sensible. Thought, or the action of the intellect, is—as we saw in speaking of the "agent of Logic"—based upon, or rather sets out from experience, but rises above it into the higher sphere of the supra-sensible and transcendental. Truths belonging to this sphere are called truths of the intellect, or truths of the reason, in the wide sense of the term. Now, to know that these truths are true, reason must apprehend, *i.e.*, *see* their truth; and this can only be done by knowing the *reason* why the judgment or proposition enunciated about them is what it is, and not other than it is. Such knowledge may be either clear and well ordered, or obscure and confused. In both

cases it may form the basis of a judgment; but in the first case we judge according to the light of reason; in the second case we judge according to "common-sense." Hence the subdivision of Reason as a source of knowledge.

(a.) With reference to what has been said, the **discernment or light of reason** may be defined, the apprehension of the truth of a proposition by means of clear systematic knowledge of the grounds upon which its truth depends. This definition tallies pretty nearly with that of subjective scientific knowledge;[2] and now we cannot fail to see why, in anticipation of this further meeting with it, it was on first acquaintance rather summarily distinguished from experience and faith. Subjective knowledge was then shown to be either immediate or mediate; and so therefore must be the discernment or light of reason, which is immediate in **intuition,** where the ground of the truth of a proposition is perceived at once without any process of reasoning; mediate in syllogistic **reasoning,** either **inductive or deductive.**

Thus the **truths** obtained by this source of knowledge are:

(*a.*) All first principles, or self-evident truths: these we get by intuition.

(*β.*) All truths of the intellect or reason obtained by means of induction and deduction.

We see then that reason is only a limited source of knowledge, and does not give us the mysteries of faith, which we can only come to know by means of Divine Revelation.

But is the discernment of reason **trustworthy,**

[2] See p. 142.

and so is it in its mediate and immediate judgments a motive of certainty? Without begging the question, we cannot make an argument answer this query; but it is possible to show to what extent there is no possibility of deception in this source of knowledge:

(*a.*) First of all, with regard to intuition,—in a proposition whose truth I perceive immediately, the predicate and its relation to the subject are obtained immediately by an analysis of the subject itself; *e.g.*, the whole is greater than its part. When I know what the subject is, *e.g.*, the whole, I possess in that knowledge both the predicate and its relation to the subject, as is evident in the given example; and my judgment is nothing but the transference of this relation to my thought. Here then is no possibility of deception. If there were any such possibility, if I were able to doubt or deny what I intue, or immediately apprehend as self-evident, I should have far greater reason to deny or doubt what I do not cognize as self-evident.

(*β.*) Then, with respect to mediate discernment obtained through syllogising, there will be no deception if two conditions are observed, viz., the principle from which the argument proceeds must be true, and the syllogism itself must be both materially and formally true. When this is secured, the conclusion must of necessity be true, as has been shown elsewhere.

(b.) **Common Sense**, a much maligned property, which most people claim as their own, while they disbelieve in its possession by any one who happens to have the misfortune, or perhaps the "pluck" to

differ from them, is one of those terms which serve to cloak many false meanings. It does not consist in personal infallibility in daily life, an impossible quality existing only in the self-estimation of the self-righteous; nor is it an exclusive gift belonging solely to some age or clique. Old folks must not say its monopoly is in their heads; still less can such a claim be set up by the young or middle-aged; and least of all is it true of those too numerous specimens of humanity, who make "common-sense" a synonym for their own mental obtuseness, and are usually endowed with the rough bluntness which is fast usurping the name of true simplicity. Common sense is a gift of our common human nature, hence a gift given to all, though in varying degrees—*sensus naturae communis*—and has been not unhappily described by an American writer as "reason in her every-day dress." It may be defined as that natural quality of the human reason, by means of which it forms certain judgments, and holds them to be true, without knowing clearly and systematically upon what grounds the truth of such judgments depends. Of course, an argument in disguise really underlies them; for we do not judge blindly; and the judgment of common sense is not purely instinctive; but as the reasoning is not explicit, we are not clearly conscious of it. In this way our minds apprehend many truths without going through scientific investigation and argument; and so common sense cannot be omitted from the enumeration of the Sources of Knowledge.

It is undeniable that among all people and in all ages a constant uniform judgment has prevailed

regarding certain truths which have a great influence on daily life, and which are of such a nature that without a knowledge of them it would be impossible to lead a really rational and moral life. Such unvarying uniformity of judgment must have a constant uniform ground, and this can be found nowhere but in the rational nature of man, which is essentially the same among all people and in all ages. The judgment proceeds from this common nature by means of a faculty which does not judge from blind instinct, but with rational thought, though without clearly apprehending the reason why it judges truly, or putting the hidden reason into argumentative form; and this we have seen to be common sense.

The **truths** which come to our knowledge by its means are confined to certain truths of the intellect or reason, which belong *per se* to the mediate perceptions of reason by argument. Hence the teachings of experience and the first principles gained by intuition do not fall into this category, which includes only such mediately known truths of the intellect as are closely related to our practical life, in so far as such knowledge is necessary to us if our practical life is to be rational and moral. Such truths, for instance, are—the existence of God; our duty of paying Him religious honour (the idea of Divine Unity is really at the bottom of every form of polytheism; and atheists are, compared to the mass of mankind, abnormal and exceptional, and moreover have an unerring tendency to develope into theists, or rather to show their true colours and honestly own to the belief of which they have never

rid themselves, when danger threatens in the shape of a storm at sea, a great conflagration, &c.); that there is an essential difference between good and evil; that reward or punishment awaits us in the next life; that parents are to be honoured; that man has a free will; that we must be just in business transactions; that physical ills may be remedied or alleviated, &c. All these things obviously admit of syllogistic proof, but we are certain of them with a natural certainty (q.v.), without any scientific proof of their truth.

To know whether in any given case a truth comes to us by way of common sense, we must be sure that it fulfils the following **conditions**:

(*α*.) that it can fall within the sphere of common sense;

(*β*.) that it is either actually or virtually the constant uniform judgment of all people and ages, hence has their common consent—*consensus communis*—which is strengthened instead of weakened by the progress of civilization. *Consensus communis* is not identical with *sensus communis*; it is its indicative mark.

(*γ*.) The judgments which depend on common sense must not be opposed to the first principles of reason, but on the contrary be further confirmed when these principles are applied to them, as is the case with the examples given.

If these conditions are observed, the **trustworthiness** of common sense as a motive of certainty is beyond all doubt. It cannot deceive us; and this is made clear by its very essence. If common sense could deceive us under the given conditions,

the cause would lie in our rational nature as such; and so we should be assuming that reason was, not *per accidens*, but in its very nature leading all mankind through every age into false judgments, and so into error, which would be manifestly absurd, and do away with the certainty of all knowledge.

From what has been said on the vexed question of common sense, it will be seen that its most accurate popular meaning, which may be loosely described as being "all there" in matters practical, does not differ substantially from what may in contradistinction be called its scientific meaning, which is quite wide enough to include the sober intelligent apprehension of men and things, that is, put into practice by being "all there."

(3.) **Authority**, as a source of knowledge, proceeds from the credibility of the person who testifies, and this again depends upon his knowledge and veracity; for the clearer it is that he possesses adequate knowledge of the truth or fact, and that his integrity is reliable, the more ready are we to credit his testimony, inasmuch as he is its security.

As the result of the discernment of reason is scientific knowledge, so is faith the correlative of authority, and, as the acceptance of a thing as true on testimony, it is defined: the assent by which we hold as true things proposed to our belief, on the authority of the person who affirms them. Therefore, presupposing his credibility, faith may be as good a ground for certainty as is scientific knowledge; but, in the absence of this condition, faith must give place to more or less probable opinion (q.v). It may be worth while to call attention to the

implied consequence, that belief and opinion are essentially distinct, though they are often used interchangeably in ordinary parlance.

In Authority, as a source of knowledge, the person who testifies, and who is the security for what he affirms, is called a witness; and his communications form his testimony. The witness is either Divine or human, God or man; and hence the division of authority under its present aspect.

(a.) **Human Authority.** The **truths** we get to know by means of this source of knowledge are of two kinds:

(*a.*) Theoretic and practical propositions which in themselves are ascertained by reason, but which may be also attested by human authority;

(*β.*) Facts of experience which, either owing to our distance from them in space or time, we are unable ourselves to perceive.

Hence, according to this division, the kinds of human testimony must likewise be twofold, viz., Dogmatic and Historical.

Now, **Dogmatic Testimony** is evidently not the source of knowledge to which theoretic and practical propositions primarily and properly belong, for we have seen that they come to us through reason in one or other of its two forms. Hence human authority cannot *in itself* vouch for their certainty; and, as its worth is only proportioned to the value of the *grounds* upon which the teaching rests, no science can be established by its means. Thus, from a scientific point of view, its service is very subordinate indeed.

In another aspect, however, it not only has its

uses, but is even necessary: for as an instructor it is an essential condition in that part of education which has the training of the mind for its end. A child takes his first teaching on the authority of his teacher, who says—for instance—that gold is malleable and ductile. He holds it on faith until he comes to know later on in life how the truth of his teacher's proposition can be proved; then, when he has tracked it to its causes, it becomes scientific knowledge. Our friend, common sense, tells us that this is the natural process followed in the development of human reason, and that thus all our strictly rational knowledge practically begins with faith. Again, all of us who are not scientists, and the average men and women of the world, who have neither the brains, nor the physique, nor the time to investigate facts, and put them together systematically when found, are very much in the position of children under a teacher, with this difference that our faith in the facts of science is not likely to blossom later on into scientific knowledge, as may the simpler facts put before children. Very few people indeed calculated the distance of the earth from the sun last time Venus gave us an opportunity of getting the sum right by journeying across his disc; but we all believe our teachers, the astronomers, when they give us the result of their computations. Reason itself inclines us to put faith in those best skilled in any art or science, according to the saying *Cuique in suâ arte credendum*, a text from the bible of common sense.

Widely different from the comparatively limited scope of dogmatic testimony is that of historical

testimony, which bridges over the distance that separates us either in space or time from facts of external experience, and so is the proper and only source from which we get to know them. Hence its value and necessity, for the sphere of even the most extended personal observation is very limited, and it is sometimes absolutely needful that we should know things of which, but for human testimony, we should always remain in ignorance. The three channels of historical testimony are **Tradition,** when the relation of facts is handed down orally from generation to generation; **Written documents,** when the story is transmitted by writing; **Monuments,** when it is represented by means of art.

The **trustworthiness** of human testimony depends primarily on the **credibility of the witnesses,** *i.e.*, on their knowledge of what they affirm, and on their veraciousness; and for these to be undoubted there must be the following **conditions:**

(*a.*) The **fact** related must have been in itself possible, and possible under the given circumstances, either naturally or supernaturally, and be of sufficient importance to arouse the attention of those who attest it, or to excite their interest and so induce them to investigate it.

(*β.*) The **witnesses** must either have themselves observed the facts asserted, or have had unquestionable means of information; they should usually be numerous, and differ from one another in character, interests, associations, views, and personal bias. In this case, their testimony cannot possibly concur unless it be true. If only few in number, they must all be of unimpeachable integrity, or else the facts

they relate must have been known to many of their contemporaries, by whom they are not contradicted either implicitly or explicitly. Lastly, they must not deliver their testimony in a party spirit, or write from a prejudiced point of view.

(γ.) Their **relations** of their common subject-matter must at least agree in substance, *i.e.*, there must be no diversity of statement as to essentials; diversity in regard to minor details there must always be, and often it serves to strengthen rather than weaken the main assertion.

By all these means we can assure ourselves of the credibility of the witnesses; but the trustworthiness of human testimony depends likewise on the **integrity** of their testimony, *i.e.*, whether it comes to us as it was actually delivered by them. This, in its turn, depends on certain given **conditions**, viz.

(*a*.) With respect to the matter of **Tradition**, it must have been something well known to and observed by many persons; the tradition itself should be full and unbroken.

(*β*.) **Historical documents** must be authentic, *i.e.*, written by the person to whom they are attributed. If this cannot be proved, they must at least belong to the age in which he lived; but a document of this latter kind, *i.e.*, a spurious contemporary, has in itself taken singly no authority, though it may serve to strengthen that of an authentic one. Then, documents must be genuine, *i.e.*, they must contain exactly what was written by their author, neither less nor more; which they will not do if they are corrupted by faulty copyists, or cut down or added to by an interpolator. It is the province of

historical criticism to examine and either to prove or disprove the authenticity and genuineness of alleged historical documents on grounds extrinsic and intrinsic, according to laws and rules which do not fall within the scope of Logic. Acquaintance with them cannot be better made than from Father de Smedt's *Introductio ad historiam ecclesiasticam* and *Principes de la critique historique.*

(γ.) **Monuments**, whether statues, pictures, inscriptions, buildings, etc., must be coeval with the deeds they attest, and in no way contradictory to trustworthy records and tradition.

If these two lists of conditions be observed, it is as clear as noon-day that we can have no reasonable doubt of the facts that we learn by means of historical testimony. Dogmatic testimony, which affirms truths of the reason, may not in itself—as we have seen—be sufficient to produce certainty; but common sense, the concurrence of many judgments, and the utter improbability of the contradictory (to say nothing of argument), in innumerable instances make it impossible to doubt truths which come to us solely through dogmatic testimony.

Thus it will be seen that the human faith, which holds society together in mutual trust and confidence, is based partly on dogmatic and partly on historical testimony, accordingly as it assents either to some truth of the reason or to some fact of experience; and so closely is it allied to common sense that it is often extremely difficult to discover which of them is practically our motive of certainty. For full and most able demonstration of the necessity of belief in daily life, see the lecture on *Belief a*

necessity, No 1. of the series on the *Spirit of Faith*, by Bishop Hedley, and St. Augustine's *De Utilitate credendi*, chapters 12 and 16.

(b.) **Divine Authority** is not of course to be reckoned among natural sources of knowledge, because Divine Revelation is supernatural, and its truths come to us in a supernatural way. Hence Christianity, in which we receive divinely revealed truths on Divine authority, is not natural but supernatural knowledge. Hence, it must be based, on the one hand, on a supernatural motive—the veracity of God Who reveals Himself; and, on the other hand, on the supernatural light which enlightens the human soul, and elicits its act of faith. Nevertheless, Divine Authority must not be entirely passed over in the enumeration of the sources of knowledge; for, in studying the "end of the act of the agent" we are really on the boundary line between Logic and Philosophy, and, as in studying Philosophy it is of the utmost importance that we should keep well before our minds its relation to Divine Revelation, we must know the leading principles that refer to Divine Authority as a source of knowledge.

The **truths** of which we become cognizant by means of Revelation are of two kinds, or rather belong to two classes of subjects, viz.:

(*a.*) Supra-rational truths, or—as they are called—mysteries, which as such transcend the natural comprehension of human reason, and can never be either discovered or demonstrated solely by its means, *e.g.*, the Trinity, the Beatific Vision after death, etc.

(*β*.) Truths which are *per se* truths of reason, and can be known and proved as such, *e.g.*, the wisdom and goodness of God, the Creation of the world, etc.

It is obvious to say that for the first of these two classes of truths Divine Revelation is an absolute necessity, if we are to know them at all; for such knowledge will not come through any other channel. Reason tells us, it is true, that God as the infinite and eternal Truth can and must contain within Himself truths unattainable by our limited human reason; but this clearly involves the corollary that, if we are to know such truths, Divine Revelation is absolutely necessary for our knowledge. For the second class, on the contrary, Revelation is not *absolutely* necessary, because the truths it comprehends could possibly be attained by unaided reason. Yet it is most certainly *morally* necessary; for their attainment by unaided reason is practically very difficult and in many cases as practically impossible. It demands much time and hard study; and, moreover, reason itself is in consequence of its natural narrowness and weakness liable to fall into error. Hence, if these truths were not in Revelation, they could only be known to few persons at the cost of protracted studious labour; and even then would be fragmentary; mixed up with error, and difficult to maintain; while to the mass of mankind they would be utterly unknown. If this is not to be, if the knowledge of these truths is to be offered at all, if they are to be free from any admixture of error, they must be directly revealed byGod Himself: therefore, as containing *them* in contradistinction to its other

supra-rational truths, Divine Revelation is at least morally necessary. For the full development of this point, see St. Thomas' *Contra Gent.* l. 1, c. 4.; and *Summa Theol.* p. 1, q. 1, art. 1; 2a 2æ, q. 2, art. 4. c., from which the passage just concluded has been taken in substance.

Of the **trustworthiness** of Divine Testimony, there is not of course, there cannot be the shadow of a doubt. If God vouchsafes to give us a Revelation, it follows as a matter of necessity that the truths revealed come from Him, and that He is the guarantee of their truth and the motive of their certainty because He Himself is absolute Truth Who cannot deceive or be deceived. Therefore we are bound to receive such truths unconditionally even when they transcend out rational powers. That they should intrinsically militate against reason, we have already shown to be an impossibility.[3] The duty of accepting Divine Revelation presupposes, however, two **conditions,** without which faith in revealed truths on Divine Testimony would be impossible. They are:

(*a.*) We must be quite sure that God *has* revealed Himself, *i.e.*, that there is a Divine Revelation. He, who offers us a Revelation from God, must unmistakeably prove his Divine mission, and in some way testify to the truth of what he offers as the Divine message. Such proofs usually consist of miracles and prophecy when a country first receives the Gospel tidings. In so far as the reason apprehends these or any other proofs which bring home to it the fact of Revelation, they become what are called motives of the credibility of Revelation.

3 P. 156.

(*β.*) The **integrity** of Revelation has to be proved, viz., that its matter is pure and unadulterated, and so neither distorted, mutilated, nor falsified; hence that there is a true interpretation of it for all persons and for all times. Now this can only be under one condition, viz., that it is confided to a single authority empowered to do all this for us. Hence, there must be a church established by God to be the depositary and guardian and interpreter of His Revelation, and for this end endowed with the prerogative of infallibility. Then the Church must be recognizable as such, *i.e.*, she must have such marks as will show her forth and prove her to be the true infallible Church established by God—*Ecclesia Dei.* And she has them. "She is *One*, she is *Holy*, she is *Catholic*, she is *Apostolic*." Proof of them would lead us beyond the domain of Logic; but it remains to be noted that, inasmuch as they are apprehended by the reason, they are to it the motives or means by which it recognizes and acknowledges the Church as true and her teaching as full and faithworthy.

The Sources of Knowledge as guarantees of Truth and motives of Certainty being Criteria of Truth *per quod*, lead up naturally to the consideration of the Criterion of Truth *secundum Quod.*

CHAPTER III.

V The criterion of Truth and principle of Certainty.
VI. Rules for attaining material truth of thought.

V. Criterion of Truth and **Principle of Certainty.** Though the sources of Knowledge are the channels of Truth and its guarantees, we cannot have passed them in review without freely owning that by themselves they are insufficient criteria of conceptual Truth. The senses one and all may be out of order, and their perceptions become in consequence occasions of intellectual error. Human reason and human authority are not infallible; and we all know by experience into how many errors they may be led by the influence of prejudice, of morbid imagination, of wrong teaching, and by the misdirection of a wayward or stubborn will. Beyond them then, we need a safer and more trustworthy measure, a criterion according to which—hence called *criterion secundum quod*—we may know whether the judgments we form in every sphere of truth (with one exception hereafter to be noted) are true or false. Hence the Criterion of Truth may be defined as, that according to which we distinguish the true from the false in our cognitions; or, the rule according to which the intellect *ought* to judge of all things.

The Sources of Knowledge give us the *grounds* for the truth of the cognition; by the Criterion of

Truth we should perceive whether these grounds make the truth of the given proposition perfect and certain, and therefore utterly exclude its contradictory. Hence, as finally producing certainty, the criterion of Truth is called the Cause or Principle of Certainty. It does not enter into the limits of the present work, to show why we cannot accept a criterion purely external, such as are proposed by Huet and Bautain, Lamennais, or Jacobi; or why the merely internal criterion as proposed by Descartes, Reid, or Kant is opposed to the teaching of scholastic philosophy; but it is necessary to remark at the outset that the subject of our present inquiry is not a simply *subjective* criterion, by which the individual intellect unfailingly assures itself of the truth of each and every one of its cognitions. To assert the existence of such a criterion would be to vindicate for the human race the gift of infallibility; and the logic of facts has as yet given us no reason for adding this article to our philosophical creed. But a criterion there is, mainly *objective*, the motive cause of all knowledge, the mother of science, the sole genuine fountain of true certainty; and this criterion, if it is to fit into its definition, viz., "the rule according to which the intellect *ought* to judge of all things," must be **Objective Evidence,** *i.e.*, the intelligibility of the thing; or—in more intelligible phraseology—the object of thought itself, which is, either mediately or immediately, so obviously presented to the understanding, that we necessarily judge the thing must be as it is, and cannot be other than it is. "Cannot be other than it is," is, however, a phrase

with at least two distinct shades of meaning. If the evident proposition is a necessary truth, the phrase of course is of universal application; if it is a contingent truth, the meaning is simply this, that it cannot in point of fact be otherwise in the given case and under the given circumstances.

Viewed with regard to the evident **truth,** Objective Evidence is of three kinds corresponding to the three kinds or degrees of certitude:

(*a.*) **Metaphysical,** *i.e.*, absolutely unconditioned; therefore eternal and unchanging; therefore absolutely excluding the possibility of its contradictory; therefore the property of truths which are supreme in the great hierarchy; therefore nearest to the throne of wisdom. Such, for instance, is the evidence for the great principle of contradiction—*the same thing cannot at the same time be and not be in the same relation.* It is so clearly intelligible that we cannot conceive the possibility of anything endangering its supremacy either in the past or in the future, in the actual, or the possible.

(*β.*) **Physical,** *i.e.*, conditioned by the Divine Will; therefore its contradictory is a physical impossibility. This evidence is biform in character: it either illumines a fact of nature as being a fact, *e.g.*, the magnet attracts iron, the ocean waters generally ebb and flow; or it illumines an event which is future, but which will take place according to the regular operations of nature, *e.g.*, there will be full moon on the 30th of this month, the thermometer will fall below 80° Fahrenheit next month.

(*γ.*) **Moral,** *i.e.*, conditioned by the human will; therefore its contradictory is only morally impos-

sible. This kind of evidence may likewise illumine either a fact past or present, *e.g.*, St. Mary's Abbey, York, was the monastic home of Alcuin,—Paris is the capital of France; or things yet future, *e.g.*, the Pope will recover his temporal power. It is clear that, if Alcuin had been so minded, he might have done otherwise than accumulate his erudition as a monk of St. Mary's; that, if the men of the olden time had chosen differently, Paris might never have been built; and it is almost more clear that the assertion about the Pope recovering his temporal power depends for its verification on the free agency of many human wills.

With reference to its **intelligibility,** Evidence may be:

(*a.*) **intrinsic,** *i.e.*, when it is inherent in the proposition itself as an intrinsic truth, *e.g.*, the whole is greater than its part; here the intrinsic truth of the proposition is clear from simple comparison of the two concepts.

(*β.*) **extrinsic,** *i.e.*, when the proposition is evident, not intrinsically, but merely from the testimony to its truth of an extrinsic credible witness; such, for instance, as internal and external experience; *e.g.*, the proposition, "I exist," is evident from the testimony of self-consciousness. Truths, too, which come to us by way of authority, fall naturally into the category of propositions extrinsically evident. But we must make a distinction between the evidence of experience and the evidence of authority. Strictly speaking, this last does not make evident the thing testified, but the fact of our possessing intact the testimony of a witness, and the further fact of his

credibility: hence its name of evident credibility; *e.g.*, the conspiring evidence of human testimony tells me that William the Conqueror gained the battle of Hastings, that Cicero wrote *De Officiis*, that Xenophon wrote the *Anabasis*, and that there are vast prairies in America.

With regard to its **grounds** on the one hand, and on the other with regard to its **relation to the human intellect,** Evidence, again, is either

(*a.*) **immediate,** *i.e.*, when the intellect intues its truth, and hence has no need of argument; that is to say, the light of evidence shines out of itself on the mind of man, and compels assent. Such truths, to adopt the expression of Cardinal Pallavicino, "carry the testimony of their truth graven on their forehead," and comprise the immediately evident truths of the reason, *e.g.*, things which are double of the same are equal to one another, and the immediately evident truths of experience, *e.g.*, I exist, I think, there are solid bodies outside of me, &c. Hence we see that immediate evidence may be either intrinsic or extrinsic. By it are illuminated the great first principles, the fundamental truths which have been called the "buttresses of the temple of wisdom," and which, we have seen, serve as a *point de départ* for demonstration.

(*β.*) **mediate,** *i.e.*, when the evidence is made apparent either by induction or deduction. Truths only mediately evident are not at once evident in themselves, but their evidence is germinally included in other truths which are, *hic et nunc*, immediately evident to the intellect which has formed its judgment concerning them. Reasoning, we know,

developes implicit germinal evidence into explicit life; and so, with its object thus illuminated by the evolution of the light of evidence hitherto latent, the intellect assents. To what? To the conclusion of a syllogism either perfect or cryptical.

Though **Evidence** is primarily and **in itself objective,** yet **in a subsidiary sense** it has a **subjective** meaning; just as certainty, which is primarily subjective, is in a secondary sense objective. When an object shining with the light of intelligibility presents itself before the intellect, and awakens it to an act of adhesion, to an assent, or judgment, the concept or judgment is irradiated—so to say—with the shining brightness of the object, and is said to be itself evident. Hence the application of the term in common parlance, but it is at best only analogical.

While it is quite true to call the Criterion of Truth the Principle of Certainty, we must not infer, nay, we cannot infer that Objective Evidence is what *actually*, in the generality of cases, induces the intellect to assent, and determines it to pronounce a judgment. This is done by what is called the **formal object of certainty,** because it is *practically* the motive which determines the intellect to judge. It must not be confounded with the *material* object of certainty which, we have said or implied elsewhere, is the thing we know, or are certain about. Now, the motive which induces the intellect to pronounce its judgment differs in several respects from Objective Evidence, and so has no right to be taken for it, and called the Criterion of Truth, because: the inducing motive is something individual; it gives

the reasons why, *hic et nunc*, I judge this or that to be the case; it is subjective to *me;* it varies according to my nature, my interests, my preconceived notions; it may be perverted by my will, or by ignorance. Objective Evidence, on the contrary, is something apart from the individual; it gives the reasons why I *ought* to judge this or that to be the case; it is independent of all that affects the individual; it is something outside of me, though attainable by me. The one regards each special man; the other, a normal man such as he would be if he were perfect and not subject to error. The one gives me what satisfies my mind; the other, what satisfies the requirements of truth. In the *ideal* man the two would coincide; but we are unfortunately fallible, and are quite certain about a thousand things that are false—quite certain be it repeated, for subjective certainty in its wide meaning consists in the adhesion of the mind to its judgments without fear of error, and those judgments may be either true or false. Dr. Döllinger, for instance, professed himself quite certain that the dogma of Papal Infallibility was a modern invention got up at the Vatican Council. There was something which induced his intellect so to judge. What? His early prejudices, individual training, misinterpretation of facts, and possibly the love of being the head of a party. And so there is something which induces certain members of several modern governments to judge that children's brains should be worked at high pressure; Mr. Bradlaugh, that the common sense of mankind has gone astray in accepting as a truth the existence of God; Ingersoll, that mysteries

and Revelation *in toto* are an irrational myth. Yet the Objective Evidence of what all these people hold is *nil*. Hence, when we say that Objective Evidence is the universal rule of our judgments, we mean that it is the rule which *ought* to govern our judgments, not the rule which *does* as a matter of fact govern them from first to last.

That no false proposition can be really evident, is a necessary consequence of Evidence being the criterion of truth; how comes it then that the formal object of certainty induces me and the rest of fallible mortals to adhere tenaciously to false judgments on occasions? The answer gives the very ground of obstinate error, which is that we consider a proposition true and certain, which is not and cannot be evident. We do so, because we either lack the means to attain an evident cognition of the truth, and hold to, what under the circumstances, *appears* to be true, though it is not so actually, and then our error is what is called invincible; or our wills are perverted, and we stop short in our investigation of truth and our endeavours for its evident cognition, or else we voluntarily close our eyes to the light and cling to our false judgment in spite of our inability to deny the evidence for its contradictory; and then our error is known as vincible. But the fact of our having no evidence for it does not prevent us from thinking that we have. Indeed in most cases of error, probably, we are under the impression that there is adducible evidence for the false proposition to which we cling; we do not meet every day, though we do meet on some days, with certain creatures possibly

human who practically hold their *ipse dixit* to be the one criterion *per quod* and *secundum quod* they and the whole world ought to judge of all things. It is most common, on the contrary, for another set of dealers in positive assertions to support a false judgment on the plea that "it is evident." Evident, no doubt, they think it, either from their insufficient examination of the matter, or from their unwillingness to look at the subject in any other light than that of prejudice; but evident in *fact* it is not.

All that has been said of Objective Evidence as the Criterion of Truth refers, of course, to our judgments in the natural order, which do not include assent to the truths of Revelation. *They*, clearly enough, do not fall within the sphere of the Criterion of Truth which is Objective Evidence. Their criterion is Revelation itself; and, in the case of those truths of which we might have a fragmentary, unsatisfactory knowledge by means of human reason, but which are clearly and distinctly made known to us by Revelation, it is evident that Revelation is a much surer test than their Objective Evidence which is practically next to impossible to get at. Such truths are mainly religious and ethical. Hence the sphere of Evidence as the Criterion of Truth is limited to natural truths; but the sphere of Revelation as a Criterion is not absolutely limited to truths supernatural. Moreover, for purely natural truths Revelation is a kind of negative Criterion, for what is *actually* in contradiction to Revelation connot possibly be true; and so, when such propositions are met with, they may at once be rejected as false. The reason is that supra-rational can

never be at variance with rational truths;[1] *apparent* contradictions there may certainly be; but the more fully the light of reason is shed upon them, the more rapidly the misleading appearance melts away. One word of caution: a negative criterion is not a positive criterion, be it remembered; and it would be absurd to say that because some merely natural judgment does not contradict Revelation, therefore it is true.

But although the mysteries of our Christian faith and in general all Truths of Revelation are not intrinsically evident, they are nevertheless extrinsically evident, or rather evidently credible. For it is perfectly certain that Divine Authority is credible, because God is Truth itself—"the very Truth Who cannot deceive or be deceived;" and it can be proved to demonstration that He has really revealed Himself to us, and that the Church—Christ's Changeless Bride without spot or wrinkle—is the infallible depositary and interpreter of Revelation; and this we have already seen to be evident credibility;[2] hence the truths of Revelation are extrinsically evident in the secondary sense of the word (q. v.), or evidently credible. Now *because* they are only evidently credible, the assent of Faith is and always will be a *free act*, which it is possible to withhold. Intrinsic evidence *constrains* the intellect to judge one way or another when it happens to coincide with the formal object of certainty; when it does not coincide with the power which induces

[1] See St. Thomas, *Contra. Gent.* l. 1, c. 7.; In l. Boeth. *De Trin.* q. 2, art. 3.

[2] See St. Thomas, in lib. *Sent.* 3, dist. 24.

assent, it has no influence whatever on the judgment or next to none. But, with regard to truths that are only evidently credible to it, the intellect is only *under the necessity* of accepting them in so far as it has no rational ground upon which to base assent to their denial. This necessity is indirect rather than direct, and so is in no sense unconditioned; for it really is the will which determines the intellect to assent to and accept revealed Truth. Hence, though Faith is certainly an intellectual act, it is so only inasmuch as the intellect is determined by the will to assent; and hence too is Faith a free act.[3]

If the question of Certitude and Conceptual Truth has been treated more fully than may at first sight appear consistent with the plan of the present volume, the reason must be sought for in the importance of the subject. Its relation to philosophy is not only initial but fundamental. More than this, to use the words of "Balmez," in this foundation of the scientific edifice, if examined with attention, you will see the whole edifice traced out. It is a plane on which are projected in a very visible manner, and in beauteous perspective, the whole solid structure which it has to support.[4]

From what has been advanced, finally, we are now in a position to draw definite conclusions, based on motives "just, useful, and necessary, delightful and easy," and applicable to every mind which, at the threshold of knowledge, asks itself—"what must I do, and what must I avoid, if, in the labyrinthine windings on the vast tracks opening before me, I

3 See *Summa Theol.* 2a. 2æ, q. 1, art. 4.
4 *Filosofia fundamental*, c. 1, n. 2.

am to attain Truth and true Certainty?" These conclusions are the

VI. Laws on which depends the Material Truth of Thought, or the rules we must observe if we would ensure the material truth of our cognitions. Of these laws the three principal are of a **theoretic or speculative** character, and so form a class distinct from those that may, by way of distinction, be called **practical.**

The laws of the first or **speculative** class are:

(1.) To assure ourselves of the material truth of a proposition, it must, if not immediately evident, be proved, and proved in such a manner that the grounds of its truth are drawn from the source of knowledge to whose sphere it belongs.

(2.) A proposition must only be accepted as true when it has, by means of these grounds, become objectively evident; for, from a strictly logical point of view, a proposition that is not objectively evident cannot be received as true.

(3.) If a proposition is not to be accepted as true unless it is objectively evident, so—on the other hand—when an evident proposition has been received as true and certain, it cannot logically be matter for further doubt, though we may have occasion to restrict our acceptance of it within certain limits.

As a foil to the sweeping character of these three rules—which obviously do not apply very closely to the ordinary run of practical life—it may be noted that, in order to prevent the danger of our ascribing objective evidence to a proposition which has none, particularly in the higher order of truths that border upon or even pass into the supernatural, it is well to

ascertain that the proposition in question is not in contradiction with Revelation.

The laws of the second or **practical** class are;

(1.) To lay aside preconceived notions or prejudices, which are a veritable and prolific source of error. The way to do this, is to examine them dispassionately and critically, sitting in honest stern judgment over our own selves, and not to shrink from throwing overboard our prepossessions and foregone conclusions if they prove to be false. Prejudices are of many kinds, and arise from many causes; but this is not the place for their examination.

(2.) Not to be guided in our thoughts and inquiries by mere feeling, nor to allow ourselves to be under the dominion of any passion; for by unsubdued passions and unruly inclinations the will is perverted; and most errors are caused by a perverted will, which leads the understanding into false ways, and compels its assent to what is false by blinding its sight to the light of truth. So, if we would seek truth *to find it*, we must keep ourselves free from passion, and prosecute our search with a sincere and earnest good will.

(3.) To avoid one-sidedness and narrowness in our studies. It often happens that when study is confined to one sphere of truth, or to a single science, other truths and sciences are in consequence undervalued, and this frequently leads to a denial of their truth. We cannot see what lies beyond our little circle; and, because we cannot see it, we will not admit its truth. Such one-sidedness is, to say the least, a sign of eccentricity and conceit,

and always make a man ridiculous. But it is a malady of other departments of thought as well as of what is technically called study; and everywhere it is an enemy to the attainment of truth. Like the people under the dominion of prejudice or of perverted will, narrow-minded folk shut the door—so to say—in the face of truth; and among them are usually to be found believers in the myth of personal infallibility, and certain self-constituted judges in Israel, whose judgments of their fellows lack faith in good intentions, and charity of interpretation.

(4.) Not to lay aside—in practice at all events—the study of Logic. To do so would be to lay ourselves open to the danger of accepting unproved assertions for proved propositions, taking ridiculous fallacies for legitimate arguments, and utterly misconceiving the matter in hand. This does not mean that we are never to lay aside the study of the technicalities of Logic; nor that dexterity in the application of what may be called the framework of merely Formal Logic constitutes a good reasoner, any more than an abiding sense of the dry rules of grammar constitutes a good writer; but it does mean that we should never fail to apply the rules of Logic, mainly the rules of Method and Material Logic, to cases that demand accuracy and exact thought. This is not done by certain young scribblers of both sexes, for instance, who occasionally undertake to publish papers on subjects of which they do not fully know the meaning and scope; hence cannot divide into natural parts, or support by congruous arguments; while they seek to cover their ignorance or mental slovenliness by

rhetorical figures, poetic phraseology, light-heeled comparisons, etc., to the mental detriment of readers who have not sufficient critical acumen to reject the gilded bauble.

(5.) Not to shirk the labour of thought; we often consider a proposition true, and deem it unnecessary to trouble ourselves further about its proof, when, if we looked at it more closely, we should see that it was by no means evident. Resulting from a form of mental indolence, which may be described as habitual passivity of thought, this habit of taking in ready-made views, and submitting without effort to the ideas set before it, is in its very nature inimical to the earnest search after truth, which is ever on the alert to examine, discriminate, compare, pursue, and judge for itself. Not inconsistently, minds that are strangers to the patient labour of studious thought, and like to be fed as children are fed, are not unfrequently smitten with the plague of "viewiness." And this from the very nature of the case. Because they do not take the trouble to think a thought right through for themselves; because they have little, if any care to discriminate the true from the false in the omniscient utterances of periodical literature, they are able, at a moment's notice, to retail from these questionable sources of knowledge views on all subjects from pre-historic man to the cause of the latest abnormal sun-spot, from the utility or non-utility of philosophy to the last speculation of Barnum. Do these viewy dogmatisers minister to the interests of Truth?

(6.) To observe a determined order and method in study. If we study in a confused mixumgatherum

sort of fashion, our brains will be "all abroad" in a hopeless haze, where—if we may trust the teachings of experience—false impressions and errors of all kinds grow into convictions without restraint. Order in study both presupposes and strengthens some kind of general order in reading, and so preserves the mind from the enervating habit of dipping into multitudinous books without aim or purpose,—a habit not to be named in the same breath, though unfortunately sometimes confounded by the thoughtless with a direct minister to truth, viz., Catholicity of taste in literature.

(7.) Not to allow the imagination too much play. Unless this naturally unruly faculty be kept well in hand under the discipline of reason, it will lead us into all manner of blunders; for it has the unfortunate propensity to bring before the intellect, and often determine it to regard as true, things exaggerated and distorted out of all resemblance to their supposed original in the sober land of facts. Quite as necessary is honest self-judgment in restraining the vagaries of the imagination, as in dismantling the mind of prejudices.

(8.) Not to allow ourselves to be deceived, on the one hand, by mere words and phrases; or to be led astray, on the other hand, by excellence of style. Empty verbosity is one of the literary plagues of the day, and newspapers and periodicals of all classes save the highest, are largely infected by it. When an objection cannot be answered, when an argument cannot be met, when an assertion is not quite to an opponent's taste, and in many other like cases, a brilliant saying, a witty repartee, a party

watch-word, declamatory abuse, sometimes even grandiose twaddle suffices to lay waste the interests of truth, and override its supporters. A like effect may be and often is produced by the influence of a good style; for a reader may be so captivated by the graces of elegant diction and the beauty of its ornaments, as to overlook the inaccuracy of the facts and arguments, and so be led to yield his assent to error. Hence the necessity of judging of things in their real nature and just relation to one another apart from the use of language; and this will be secured by confronting high-sounding, clever, positive, or wordy phrases, or by divesting ourselves of the prejudice in his favour with which an author's style may have inspired us, as the case may be, in order to get to know the exact meaning of the assertions claiming assent, and then to test them by proof. The result of such an examination shows but too often that they are all but meaningless, or else the mask of error.

When we consider how important it is, with respect both to our temporal and eternal interests, to be sure of the truth of our knowledge, and how momentous are the consequences of error both to individuals and to mankind in general; we cannot fail to acknowledge ourselves obliged to strive to secure mental accuracy, and hence to observe the rules laid down by Logic for this end in the interests of Truth.

As a set-off to all this dogmatism, however, it must be remarked that the rules enumerated, and all the strong things said about accuracy apply to the earnest investigation of Truth, which in some

one of its many forms enters into the duty of nearly every life. But there is no intention whatever of depreciating the mental pleasures, which may not lie strictly within duty's range, and yet be necessary for the mind's relaxation. It is the tendency of some hard students to think that "all work and no play" does *not* make "Jack a dull boy." But this is generally a mistake, proved to be such by the inexorable logic of facts. And so, after pouring out the vials of wrath upon desultory reading and study, the illogical productions of certain budding scribblers, the kaleidoscopic pictures of the imagination, and the brilliant sayings and excellence of style, which are not always enlisted in the service of truth; it is only fair to add that—considered *in themselves*—all these things are very far from useless. When the mind is out for its holiday, when it is weary and unfit for hard work, they help to restore its tone, and—by preparing it to resume its study of Truth with renewed vigour—are, like many other things not calling for mention here, indirectly ministering to its acquirement. But—do not let us mistake them for the direct road to it; or our certainties will not be the certainties of truth, the certainties of which St. Thomas says: "Certitudo, quæ est in scientia et in intellectu, est ex *ipsa evidentia* eorum quæ certa esse dicuntur."

QUESTIONS.

I. 1. Name any two of the six definitions of Logic.

2. Contrast one full definition with one that applies only to Formal Logic.

3. What is the purpose of Logic?

II. 1. What must there be in order to answer this purpose?

2. How does this tell upon the division of Logic?

3. Distinguish (a.) Material and Formal, (b.) Natural and Artificial Logic, and show by some comparisons the relation between Artificial and Natural Logic.

III. 1. Prove the necessity of Logic, and give an authority for this proof.

A.

I. 1. Why is man called a rational animal?

2. Why do we say that the soul "informs" the body?

3. What sort of a substance is the soul? Can it act independently of the body?

II. 1. Distinguish the three classes of human powers.

2. In virtue of what connection does each class belong to the soul?

III. 1. What are the three powers of the intellect or understanding?

2. What is the function of each?

IV. 1. What do we understand by the term, "action of the intellect?"

2. Explain how ideas are formed, and then clearly distinguish the **sensus intimus** and the **species intelligibilis.**

3. What is the process of putting together two ideas called?

Give (a.) a positive, (b.) a negative illustration from any of the following ideas: **history, art, Euclid, instructive, interesting, puzzling, sky, water, mountains, green, blue, cloudy, misty.**

4. Explain the process of reasoning, and illustrate it by two original examples.

5. What is the difference between speculative and practical reasoning?

6. Are the following examples speculative or practical:

(a.) Any one who would work that sum correctly, must have a knowledge of decimal fractions;
But I would work that sum correctly;
Therefore I must have a knowledge of decimal fractions.

(b.) All stars shine;
Sirius is a star;
Therefore Sirius shines.

(c.) A piece of furniture is held together by the forces of adhesion and cohesion;
But my desk is a piece of furniture;
Therefore my desk is held together by the force of adhesion and cohesion.

7. What is the end of reasoning? What is meant by the Logical or Rational Order?

B.

II. 1. In what relation do terms and propositions stand to Formal Logic?

2. What is the relation of reasoning to Formal Logic?

III. 1. Of what are terms and propositions the respective signs?

IV. 1. Define **term** (a.) taken absolutely, (b.) in relation to propositions.

2. Name the terms in the following:

Time flies;

"True, 'tis pity; pity 'tis, 'tis true;"

"His life was gentle;"

"This was a man."

V. 1. Distinguish (a.) simple and complex, (b.) absolute and relative, (c.) abstract and concrete terms.

2. To what classes does each of the terms in the following sentences belong:

"This is not my writing,
Though, I confess, much like the character."

"Slips of yew
Silver'd in the moon's eclipse."

Mothers love their children.

Duty before pleasure.

3. Why are genus, species, difference, property, and accident, called universals? Define, and give an example of each.

4. Name some universal and some equivocal terms, and say why they are so?

5. In what senses is the word analogy used? Which is the more usual meaning?

VI. 1. Why is a proposition called an "interpretation?" What do propositions unite or separate?

2. What is the "form" of every proposition?

3. Resolve three original propositions into subject, nexus, and predicate.

VII. 1. How would you recognize a categorical, causal, hypothetical, disjunctive proposition?

2. Pick out of the following list of propositions those which are (a.) universal; then, in succession, those which are (b.) particular, (c.) negative, (d.) hypothetical, (e.) disjunctive:

If the barometer rises, it will not rain. Water seeks its own level.

Most farmers are confirmed grumblers.

The most convenient books are octavos or duodecimos.

If we examine our own cognitional powers, we shall be able to get a clear idea, though not of course perfect knowledge, of the impassable abyss that separates us from all the lower animals.

Light cannot reach us from Sirius in less than fifteen or twenty years. Sirius is either a white, or yellow, or red, or blue, or purple, or green star.

Antares is a red star with a greenish scintillation.

If orbits of suns, like orbits of planets, are ellipses, our sun will curve away sideways long before he reaches the constellation Hercules.

"One touch of nature makes the whole world kin."

"If it were done, when 'tis done, then 'twere well
It were done quickly."

Every free and independent nation may claim the right to a native literature.

Supposings have to give in to facts.

No milkmaids like smoky slums.

If Telemachos dismisses his mother from his home, her Erinuës will come upon him.

3. Examine any five propositions in the foregoing list, and point out the subject, copula and predicate in each.

VIII. 1. In how many ways may propositions be equivalent?

2. Prove by examples that a true equivalence is to be found in each of these ways.

3. Find an equivalent of each kind for the following propositions:

"All our yesterdays have lighted fools the way to dusty death."

"All occasions do inform against me."

Every reader must be struck by the recurrence of the Phœnician name.

"All the tree-tops lay asleep,
Like green waves on the sea."

"He prayeth best who loveth best."

"This seraph-band, each waved his hand."

4. Opposition is the contrast or diversity existing between certain propositions; examine the following pairs, and state why opposition may be found in some, and why not in others:

(a.) All astronomers call Antares "the Sirius of Red Suns;" some astronomers do not call Antares the "Sirius of Red Suns."

(b.) Vega, Altair and Regulus shine with a brilliant white light; Aldebaran and Pollux are ruby red.

(c.) All rules have exceptions;

No rules have exceptions.

(d.) Some astronomers are perplexed.

Some astronomers are not perplexed.

(e.) All Jupiter's four moons travel round him at different distances;

The sun and the planets do not travel round the earth.

5. Re-examine the pairs of propositions, in which opposition exists; and say what is the kind of opposition in each.

6. What is the difference between contradictory and subaltern, contrary and sub-contrary opposition? Exemplify your explanation in each of the following propositions:

All men learn the rudiments of knowledge upon faith.

"All literatures are one; they are the voice of the natural man."

Many men are men of one idea.

Everything unsymmetrical was intolerable to Goethe.

Every star is in motion, hurrying along in space. Some move faster; some move slowly.

7. Why cannot (a.) two contradictory, (b.) two contrary propositions, both be true at once? Can (a.) two contradictories, (b.) two contraries both together be false?

8. May (a.) two sub-contraries, (b.) two subalterns both together be true? Prove your answer by an example of each.

2. Two sub-contraries cannot both together be false; why not?

Illustrate what you have said by an example.

10. May the truth of the subalternant proposition be inferred from the truth of the subalternate? If so, why? If not, why not?

May we infer the truth of the subalternate from the truth of the subalternant? Why; or why not?

Can we from the falseness of either subalternant or subalternate infer the falseness of the opposite proposition?

11. Distinguish the propositions called convertend and converse; and explain the two kinds of conversion.

12. Convert the propositions.

Honesty is the best policy.

Algol is not Arcturus.

Some stars are variable.

The "Prentice's pillar" is in Roslin Chapel.

All dictionaries are books.

13. "All gold is ductile." What can I infer from this proposition about things which are not ductile? What do I learn about things which are not gold?

14. Does a true convertend ever give a false converse? Does it ever give a true one?

Does a false convertend always give a false converse? Give an example.

15. How far can we infer truth or falseness, in

conversion of propositions, from the truth or falseness of convertend and converse?

16. From the following examples, show how the conversion of propositions leads from the Matter of Formal Logic to its Form:

The length of Westminster Abbey is five hundred and five feet.

The G.C.M. of 160903 and 66429=1. 9×2=18.

All flowers are beautiful.

All planets shine by reflected light.

IX. 1. What is the Form of the "act of the agent?" How is it treated of?

IX. 1. Examine the three definitions of a syllogism; then state how each one is exemplified in the following:

A rigidly disciplined mind never forgets that in physical science our data are very small considering the huge system of things they have to account for;

But Onesimus has a rigidly disciplined mind;

Therefore Onesimus never forgets that in physical science our data are very small considering the huge system of things they have to account for.

2. A very heavy man on earth would be a most light and active individual on Mars;

James is a very heavy man on earth;

Therefore James would be a most light and active individual on Mars.

Examine the above syllogism; then answer these questions:

(a.) Which is the middle term?

(b.) How do you know it to be the middle term?

(c.) Which is the major term? Why?

(d.) Which is the minor term? Why?

(e.) Which is the conclusion?

(f.) How do you know it to be the conclusion?

(g.) What are the two other propositions called? Why?

(h.) What is the name of the proposition containing the major term?

(i.) Distinguish extension and intension; and illustrate the distinction by circles.

3. Examine the following syllogism; then answer the same questions:

All dogs are animals;
Pilot is a dog;
Therefore Pilot is an animal.

4. What is the difference between the material and formal truth of a syllogism? Are they necessarily united? What is meant by a conclusion being true *per accidens?*

5. "It is impossible to deduce error from truth." Show how this axiom applies to the syllogism.

6. Do the following examples prove anything you have stated about the material and formal truth of the syllogism? If so, what?

(a.) Every planet is a heavenly body;
But my spinning-top is not a planet;
Therefore my spinning-top is not a heavenly body.

(b.) All poetry is elevating;
But the "Dream of Gerontius" is poetry;
Therefore the "Dream of Gerontius" is elevating.

(c.) Every man is a musician;
But Cornelius is a man;
Therefore Cornelius is a musician.

(d.) All ships are water-craft;
But the *Bellerophon* is a ship;
Therefore the *Bellerophon* is water-craft.

XI. 1. What is the main rule concerning the Matter of syllogisms?

2. On what two principles or canons do the right rules for the Form of the Syllogism rest?

3. How many terms are there in a syllogism? Why cannot there be more?

4. How many propositions must there be in a syllogism? Why not more?

5. Why should no term have greater extension in the conclusion than in the premisses?

6. What is meant by the middle term of a syllogism being distributed?

7. When and why must the middle term be distributed?

8. In which proposition must the middle term not appear? Why not?

9. Why is no conclusion obtainable when both premisses are negative?

10. What is the rule about two particular premisses? Give two reasons for this rule.

11. Why cannot a negative conclusion be drawn from two affirmative premisses?

12. If one premiss be negative, what do you know about the conclusion? Why?

13. If one premiss be particular, what can you infer about the conclusion? Why?

14. What is understood by the figures and modes of the syllogism?

15. Explain how the middle term is not distributed in the following false argument:

The nature of a clock is to indicate the correct time;
To deviate from the correct time is the nature of a clock;
Therefore to deviate from the correct time is to indicate the correct time.

16. What rules of the syllogism are broken by the following false arguments:

(a.) Some planet has a system of rings and satellites;
But Mercury is some planet;
Therefore Mercury has a system of rings and satellites.

(b.) The rose is a flower;
But the lily too is a flower;
Therefore the rose is the lily.

(c.) The study of modern languages is very useful;
But the study of philosophy is not the study of modern languages;
Therefore the study of philosophy is not very useful.

(d.) Some children are studious;
But some boys of seven are not studious;
Therefore some boys of seven are not children.

(e.) Constantine was probably born at York;
Constantine was a Roman Emperor;
Therefore all Roman Emperors were probably born at York.

(f.) Some astronomical terms are derived from the Arabic;
But equinoctial and amplitude are some astronomical terms;

Therefore equinoctial and amplitude are derived from the Arabic.

(g.) Some things attained without labour are valuable;

Some knowledge is attained without labour;

Therefore some knowledge is valuable.

(h.) No brutes are immortal;

No man is a brute;

Therefore no man is immortal.

XII. 1. Distinguish simple and compound syllogisms.

2. Why are the propositions forming categorical syllogisms called "propositions de inesse"?

3. From the following examples show how the first canon, which serves as a basis, for the rules of the syllogism, applies immediately to the categorical syllogism:

(a.) All *Z*ulus are men;

But Cetywayo was a *Z*ulu;

Therefore Cetywayo was a man.

(b.) No Saxon is a Hindoo;

But Witikind was a Saxon;

Therefore Witikind was not a Hindoo.

4. Explain how the *Dictum de omni, dictum de nullo*, is immediately resolvable into the principle of contradiction; and in your explanation introduce two original examples.

5. What are the parts of a hypothetical proposition? Upon what does its truth depend?

6. What is the relation between the middle and major terms in the major premiss of a hypothetical syllogism?

7. Upon what principle is the conditional form of the hypothetical syllogism based? Why?

8. Name the rules of the hypothetical syllogism. What results from these rules?

9. The terms of the rules may not be reversed: why not?

10. Show how the following arguments break these rules:

(a.) If he is guilty, he will like to hide himself;
But he does like to hide himself;
Therefore he is guilty.

(b.) If he is guilty, he will blush;
But he is not guilty;
Therefore he will not blush.

11. How does the first of the above arguments break the third rule of the ordinary syllogism; and the second, the second rule?

12. If the gardener has cut the flowers, I can fill the vases at once;
But the gardener has cut the flowers;
Therefore I can fill the vases at once.

Make the above argument into a categorical syllogism.

13. How do you recognize a copulative or conjunctive syllogism? Give an example of one.

14. What results from affirmation in the minor premiss of a conjunctive syllogism? For what reason?

15. Why cannot the terms of the second rule of the conjunctive syllogism be reversed? Prove what you say by an example.

16. Upon what principle is the form of the conjunctive and of the disjunctive syllogism based?

Explain this principle, and show how it is the basis of these forms.

17. Correct, or defend the following:

(a.) No one can at the same time study Greek and play cricket;
But Templeton is not studying Greek;
Therefore he is playing cricket.

(b.) Thetis could not be in the sea-palace with her thirty-three sisters and at the same time go to Olympus to procure arms for Achilles;
But she did go to Olympus to procure arms for Achilles;
Therefore she could not be in the sea-palace with her thirty-three sisters.

(c.) A triangle cannot be at once right-angled, obtuse-angled, and acute-angled;
But this triangle is acute-angled;
Therefore it can be neither right nor obtuse-angled.

(d.) No colour can be at once blue and yellow;
But this colour is not blue;
Therefore it is yellow.

18. What is the difference between the conjunctive and disjunctive syllogism?

19. What is the relation between the major and middle term in the major premiss of the disjunctive syllogism? Illustrate what you say by two examples.

20. Name the chief rule of the disjunctive syllogism, and state the necessary conditions implied in that rule.

21. Distinguish between the application of the rule to syllogisms in which the disjunctive major

has only two members, and to syllogisms in which the disjunctive major has more than two members.

22. When may the terms of the rule be reversed? When not? Why not?

23. Correct or defend the following, showing where they do, or do not obey the rule and conditions of the disjunctive syllogism:

(a.) A crime, as recognized by law, is either treason, or felony, or misdemeanour;
But forgery is neither treason nor misdemeanour;
Therefore it is felony.

(b.) A delta may be either a lake delta, an inland sea delta, or an ocean delta;
But the delta of the Nile is an inland sea delta;
Therefore it is neither a lake delta, nor an ocean delta.

(c.) Flowers are valued either for their beauty or for their scent;
The lily of the valley is valued for its scent;
Therefore it is not valued for its beauty.

(d.) Melodies are either in a major or minor key;
This melody is not in a minor;
Therefore it is in a major key.

(e.) Non-electors at parliamentary elections are either aliens, or persons convicted of forgery in a court of law, or juniors, or commissioners of stamps, or their employés, or employés in the General Post Office, or police constables, or persons in some other way disqualified;
But Pericles von Thränenberg and Honoré Guizot are employés in the General Post Office;

Therefore they are neither aliens, nor convicted of forgery in a court of law, nor juniors, &c.

(f.) Sirius is either a white, or a red, or a yellow, or a blue, or a purple star;

But Sirius is a yellow star;

Therefore neither red, nor yellow, nor blue, nor purple.

24. What is the general rule for testing the validity of compound syllogisms? Give the reason for the rule, and show by examples how it applies to each kind of compound syllogism.

XIII. 1. Distinguish (a.) Incomplete and (b.) Extended syllogisms; and say why they are sometimes called "forms of argument akin to the syllogism."

2. What kind of syllogisms are the following? Expand each into a formal syllogism.

(a.) Mars is a planet because it moves round the sun.

(b.) It is freezing hard, therefore we shall go out skating.

(c.) Ralph gets on well with his lessons because he is clever and studies hard.

(d.) There will probably be rain this afternoon because the clouds are low and heavy, and the wind is veering to the south.

(e.) I have not written my Latin exercise, therefore I shall get a bad mark.

(f.) Frank has broken his arm, so he cannot attend the gymnastic class this morning.

3. Reduce the following syllogisms to the form either of enthymemes or of contracted syllogisms:

(a.) Nothing that has extension is indivisible;
But everything that has length has extension;
Therefore nothing that has length is indivisible.
(b.) No simple essence is mutable in its nature;
But some substance is mutable in its nature;
Therefore some substance is not simple essence.
(c.) All metals are minerals;
But all metals are bodies;
Therefore some bodies are minerals.
(d.) His father lived in Keswick;
But he lived with his father;
Therefore he lived in Keswick.
(e.) All matter is divisible;
But that which is divisible is finite;
Therefore matter is finite.

4. What is a polysyllogism? An epichirema? A sorites? A dilemma?

5. Distinguish between a "pure" and a "mixed" polysyllogism. Why is the syllogistic series, to which a polysyllogism is reducible, sometimes called a "perfect polysyllogism"? When is the polysyllogism generally employed?

6. Resolve the following epichirema, which is employed by Cicero, into its component syllogisms; and say whether you consider it a conclusive argument:

If a man can be suspected of parricide, he must be otherwise most wicked, because it is a fearful crime;
But Sextus Roscius is not most wicked, because he is neither audacious, nor luxurious, nor avaricious;
Therefore he cannot be suspected of parricide.

In what circumstances is the epichirema often used?

7. On what does the formal truth of the sorites depend? Convert any polysyllogism into a sorites. In what do these two forms of argument differ?

8. Why is the dilemma called a "horned syllogism" and the "deadly weapon of argument"? What rules must be observed in every good dilemma? In what way is the strength or weakness of a dilemma proved?

9. Examine each of the following extended syllogisms; name the kind of each; then resolve it into simple syllogisms:

(a.) If schools are without Christianity, education will be without Christianity;
If education is without Christianity, the people will be reared without Christianity;
If the people are reared without Christianity, they will become un-Christian;
If the people become un-Christian, they will become anti-Christian;
Therefore, if schools are without Christianity, the people will become anti-Christian.

(b.) Practice produces dexterity;
Dexterity works confidence;
Confidence banishes undue bashfulness and timidity;
The absence of undue bashfulness and timidity ensures self-possession;
Self-possession secures the full command of personal oratorical resources;
The full command of personal oratorical resources is the measure of attainable oratorical success;

Hence practice is the measure of attainable oratorical success.

(c.) The moon is a satellite;

But every satellite is a planet;

Therefore the moon is a planet;

Planets shine by reflected light;

Therefore the moon shines by reflected light;

That which shines by reflected light is not self-luminous;

Therefore the moon is not self-luminous.

(d.) Doubt is an act of intelligence, for only an intelligent agent can doubt;

But doubt cannot doubt the intelligence that doubts, since to doubt that would be to doubt itself;

Therefore universal doubt is an impossibility.

(e.) This prisoner's challenge to the jury is unavailing, because

It is either a challenge peremptory, or a challenge *per causam;*

If it is a challenge peremptory, it is unavailing, for he is charged with misdemeanour, and in cases of misdemeanour, there is no peremptory challenge;

If it is a challenge *per causam;* it is unavailing, for no reason can be given for the objection;

Therefore, whether peremptory or *per causam,* still the challenge is unavailing.

(f.) Whatever is, in any sense, is either necessary and eternal, or contingent and created;

If you say it is necessary and eternal, you say it is God, because the necessary and eternal can alone be absolute uncreated being;

If you say it is contingent and created, you still assert the necessary and eternal, because the contingent and created is neither possible nor intelligible without the necessary and eternal;

Therefore whether you assert either necessary and eternal, or, contingent and created being, you always assert that God is.

XIV. 1. What kind of Truth has our study of Logic so far dealt with? Define that kind of Truth. 2. What is the next stage in our enquiry? Why? What relation does this stage bear to the end of Logic?

XV. What is method? In what relation does it consider thought? What are its functions?

XVI. Name the division of method, and the reasons for it.

2. What part of Method regards objective Truth *as a whole?* Why?

XVII. 1. What do you understand by definition? How is the meaning of the term seen in its derivation?

2. What terms include widely every kind of definition? Why?

3. What is the difference between nominal and real definition?

4. Enumerate the different kinds of nominal definitions; then examine the following, and specify the kind of each:

(a.) Light is that medium by which we see the colours and shapes of things.

(b.) a comet is a hairy star.

(c.) a telescope is that with which we can see from afar.

(d.) This is a copy of *The Stones of Venice.*

(e.) This is the *Contemporary.* Those are copies of *Aletheia,* and the *Formation of Christendom.*

(f.) An ephor is an inspector.

(g.) The moon is a heavenly body that shines and gives light by night.

5. Clearly distinguish the descriptive, genetic, and essential definition; showing in what they agree, and in what they differ.

6. Why is essential definition the only satisfactory kind of real definition? Why is it called conceptual definition?

7. What is the difference between a metaphysical and a logical definition? In what do they agree? What are matter and form?

8. Why must proximate genus and ultimate differentia form the components of every logical definition?

9. Why may an essential definition be considered a sort of compendium of our knowledge of a thing?

10. Explain how and why definition is limited (a) from above, (b.) from below.

11. What things cannot be defined? Why not? What two genera divide all being? How?

12. How is definition perfected?

13. Give an original example of each kind of real definition, and your reason for forming it as you do.

XVIII. 1. What is meant by a definition being (a.) adequate and exclusive, (b.) short and exact or distinct?

2. Why should a definition be (a.) clearer than

the thing defined, (b.) non-negative? When may a negative definition be legitimately employed?

3. Examine the following definitions; reject those which are faulty, and say *why* you reject them; if after this any remain, distinguish them severally as descriptive, genetic or essential, and say why you have done so; (a.) "A strong dilemma is a desperate case."

(b.) Calomel is dichloride of mercury.

(c.) An interpreter is one who interprets.

(d.) A euphemism is a rhetorical figure by which a delicate word or expression is substituted for one which is harsh or unseemly.

(e.) Man is his Maker's "chief delight and favour."

(f.) The *Tis* was the public opinion or public judgment of the Homeric world.

(g.) "A thing of beauty is a joy for ever."

(h.) A pen is an instrument made to hold fluid ink, and to spread it over paper.

(i.) Cheerfulness is the bright weather of the heart.

(j.) Astronomy is a science which treats of the solar system.

(k.) "Virtue is voluntary obedience to truth."

(l.) Courage is not boldness, it is not audacity, it is not impunity, it is not assurance; it is not daring: it is that quality which enables men to encounter danger and difficulty firmly and fearlessly: it bears a generic relation to bravery, intrepidity and heroism; and a specific relation to fortitude.

(m.) Light is produced by wave-like motions in a highly elastic medium which pervades all space.

(n.) He was a man, take him for all in all,
See what a grace was seated on this brow;
Hyperion's curls, the front of Jove himself,
An eye like Mars, to threaten and command;
A station like the herald Mercury
New-lighted on a heaven-kissing hill;
A combination and a form indeed,
Where every god did seem to set his seal
To give the world assurance of a man.[1]

XIX. 1. What is division? What is its relation to definition? What does every division connote?

2. Distinguish (a.) an actual, potential and moral whole; (b.) a physical, metaphysical and logical whole; (c.) partition, division in the strict sense of the term, and distribution.

3. What kind of wholes are the following: Virtue; confidence; beetle; chimpanzee: navy; House of Lords; desk; tree; flower; science; literature; rascal.

4. The basis of division may be either external or internal: when is it external? when internal? Illustrate your explanations by examples. Why may we have various co-ördinate divisions of the same whole?

5. Upon what principle are sub-divisions formed? What is their use?

XX. 1. Why is division of a whole into two species or classes only, the best means of ensuring the adequacy and exclusiveness of a division? Give any illustration not in the text.

2. What is meant by the co-ördination of the parts of a division, and by the parts mutually excluding each other?

[1] *Hamlet*, a. 1.

3. The division must be regular or orderly: illustrate the application of this rule.

4. What are the disadvantages of too minute sub-division?

5. Are the following divisions correct or faulty? Give the reason for your judgment of each one. (a.) "Marmion" consists of a prologue, six cantos, Sir David Lindesay's tale and l'envoi; (b.) That article runs over seven pages and two half-pages; (c.) Mivart's "Lessons from Nature" contain fourteen chapters, a starting-point and a postscript.

(d.) From a biographical point of view, history may be divided into the history of generals and the history of gamblers.

(e.) A sentence may be divided into words, letters, subjects, adverbs, predicates, nouns, adjectives, letters and stops.

XXI. 1. What is the office of argument? What is its end? Upon what does its value depend?

2. Name and distinguish the two great classes of arguments.

XXII. 1. What is Demonstration strictly so-called? How is it accomplished? 2. Show how all demonstration is based upon the axiom that "Truth contains nothing but the true;" and draw out the consequences of this statement.

2. Of what does the *matter* of Demonstration consist? What is meant by the "state of the Question?"

3. What is a *principium per se notum*, an axiom, a postulate?

4. What is the *Form* of Demonstration? Of what is it the basis?

5. Why is Demonstration essentially dependent upon the *principia per se nota?*

6. How is Demonstration limited from above and from below?

XXIII. 1. What is the rule for the thesis? When is an explanation of the state of the question invariably called for before beginning the argument?

2. What are the rules for the principle of demonstration?

3. What are the rules for the syllogism considered as part of the argument?

XXIV. 1. In direct opposition to all these rules are fallacies or sophisms; what are they? why are they treated of just after these rules? How are they classed?

2. Name the fallacies contrary to the rules of the syllogism, and say of each kind whether it is formal or material.

3. What is the fallacy of *Amphibology* or *ambiguity?* How can it be unmasked? In what does its inaccuracy consist? How do the following fallacies illustrate your answer:

(a.) He who sends forth a book into the light desires it to be read;
He who throws a book into the fire sends it into the light;
Therefore he who throws a book into the fire desires it to be read.

(b.) Bears and lions kill men;
The constellations Ursa Major, Ursa Minor and Leo are bears and lions;
Therefore they kill men.

(c.) Dogs bark;
Sirius is a dog;
Therefore Sirius barks.

(d.) "If thou never wast at court, thou never sawest good manners; if thou never sawest good manners, then thy manners must be wicked; and wickedness is sin, and sin is damnation. Truly, shepherd, thou art in a perilous state."[2]

4. What is the fallacy of *Composition and Division?*. In what does its fault consist? How may it be unmasked? Prove what you have said from the following examples:

(a.) It is impossible for white to be black;
But this paper is white;
Therefore it cannot become black.

(b.) "Three and two are odd and even numbers;
Five is two and three;
Therefore five is odd and even."

5. Explain the fallacy of *Collective and Distributive meaning*. How does it violate the rules of the syllogism? How do I fall into this fallacy by concluding that, because the ministers in Cabinet Council came to a wise decision, therefore any one of them would have done so singly?

6. How do we pass from a "*dictum secundum quid*" to a "*dictum simpliciter?*" Why should we not do so? A lunatic would fall into this fallacy if he argued that I ought not to take his sword from him, because no man should withhold the property of another: where does the inaccuracy of reasoning lie?

7. What is the *fallacia accidentis?* Give two or

[2] *As You Like It*, iii. 2.

three examples, and show where the fault lies in each. The child of a soldier in the Scotch Greys infers that all horses are grey, or a Malay infers that all persons are yellow; why is each of these inferences a *fallacia accidentis?* How may this fallacy be unmasked?

8. When Ikon, the hero of Miss Giberne's charming instructive story, *Among the Stars*, argues that "winter has come because we have frost and snow," and that "Fritz knows a great deal about the stars because he has a telescope," what fallacy is he making use of? In what does this fallacy consist?

9. Tell me five or six ways in which the question may be evaded, and give an example of each. How is the question evaded in each of the following arguments:

(a.) "Human knowledge is at best only progressive," is the proposition for proof; and the points proved are, that there is no royal road to learning, and that all short schemes should be rejected as dangerous.

(b.) A boy under examination has failed in arithmetic; not to lose his marks, he argues that he has passed in algebra, and that the problems in algebra involve a knowledge of the arithmetical rules in which he has failed: why am I justified in witholding his marks?

(c.) A witness charged by counsel with being absent-minded, replied, "Impossible, for I am here present."

(d.) In proving that Mrs. Siddons was a good actress, why may I not argue that she was a good woman, as was actually the case?

10. What is the fallacy called *begging the question?* Name three ways in which it may be done; and show how each of the following is a *petitio principii:*

(a.) Anger is short madness, for everyone in a passion is temporarily insane.

(b.) History affords political wisdom because many statesmen have become wise by reading history.

(c.) We cannot possibly undertake to teach that the earth moves round the sun, for we have always held the opposite theory that the sun moves round the earth.

(d.) The end of the world must be very near, for things are so different from what they were when we were young, that it is hard to see how they could be worse.

11. Are the following examples of the *vicious circle,* or not? If so, in what does their inaccuracy consist:

(a.) I prove that the earth is round by the way in which ships gradually disappear when going out to sea; then I prove the cause of this manner of disappearance by the round form of the earth.

(b.) Some months ago, a journalist tried to prove that drunkenness is the cause of popular misery; and in the course of the same leader argued that popular misery is the cause of drunkenness.

(c.) We know that "*The life of a Prig,*" *by one,* is true, because it is a piece of autobiography written by one who could not be mistaken about the incidents of his own life, and we know that

it is an autobiography because the book tells us it is so.

(d.) Ernest is urged to go in for rowing because he must get strong; and his brother Arthur is urged to get strong because he must go in for rowing.

To avoid arguing in a circle, what caution must be observed in purely objective scientific arguments?

12. What is the fallacy of *False Generalization* or *Invalid Induction?* Give an example: How many forms has this fallacy? What are they? Examine the following, and show how each is an instance of False Generalization:

(a.) I have just had a rocking-horse given me; now my father rode on his horse from Bath to Wells yesterday, right over the Mendip Hills: I'll do the same to-morrow on my rocking-horse.

(b.) A little girl, who plays the part of a fairy-queen at Drury Lane, argues that, because the gold and stones in her stage crown are mere tinsel and glass, therefore all royal crowns are valueless tinsel and glass.

(c.) Of a family of nineteen children, one boy is half-witted, and another is deformed; a rough and ready acquaintance leaps to the conclusion that all the nineteen are, from first to last, crazy either in mind or body.

(d.) Animals are irrational; therefore man, being an animal, is irrational.

(e.) More rain falls on the west than on the east coast of England; therefore more rain falls at Southport than at Yarmouth.

13. Whence the saying, "a fallacy is a nest of

fallacies?" In the division of fallacies, why do not the parts of the division mutually exclude each other?

14. State what fallacies you can detect in each of the following arguments; and say of each whether it violates rules for the syllogism, or the thesis, or the ground of demonstration:

(a.) Stars are bright because they shine; and they shine because they are bright.

(b.) "If that is good enough to be put in a book, it is good enough for you and me."

(c.) Obedience to authority is according to nature; but disobedience to authority is according to nature; therefore obedience to authority is disobedience to authority. Obedience to authority, being according to nature, is from God; therefore disobedience to authority, being according to nature, is from God.

(d.) Cows have crumpled horns; the moon is not a cow; therefore the moon has not crumpled horns.

(e.) The British army abandoned Kassala; but Sir Evelyn Wood is in the British army; therefore Sir Evelyn Wood abandoned Kassala.

(f.) Any cat has one tail more than no cat; but no cat has two tails; therefore any cat has three tails.

(g.) No timepiece can go on a frosty night, because my timepiece has stopped twice on frosty nights.

(h.) Writing ought never to be acquired, because by its means men have committed forgery.

(i.) He who pursues nothing but pleasure cannot

be happy; for it is in the nature of things that, if we give ourselves up exclusively to one pursuit, it becomes wearisome.

(j.) The kingdom of Anarchia is in distress because it is badly governed; hence every distressed kingdom is badly governed.

(k.) Inferring from the conduct of his creditors that all men are bad, Timon of Athens argues:

> All is oblique:
> There's nothing level to our cursed natures
> But direct villany.

(l.) The *minimum visibile* is the least magnitude which can be seen; no part of it alone is visible, and yet all parts of it must affect the mind in order that it may be visible; therefore every part of it must affect the mind without being visible.

(m.) I am offered a reward to assist this man in gaining an office he desires; to assist a man is to do him good, and no rule of morality forbids the doing of good; therefore no rule of morality forbids me to receive a reward for assisting this man in gaining the office he desires.

(n.) Ingersoll asserts the eternity of the universe; proof of his assertion he gives none save that it is "according to my idea."

(o.) The blind cannot read; you cannot read in the dark; therefore you are blind.

XXV. 1. By what is the division of the kinds of Demonstrative Arguments determined?

2. Explain and distinguish the arguments called *a priori* and *a posteriori*. How do their names indicate their nature? Give an example of each. Which

kind is mainly used in experimental science, in mathematics, in historical criticism?

3. Of the following arguments one is *direct*, the other is *indirect*: tell me why they are so respectively; and in your answer show the nature of each, and the difference between them:

(a.) No stone is a living being;
But every man is a living being;
Therefore no man is a stone.

Your opponent denies the conclusion on the plea that, as the arboreal ancestor of our race was an apelet, it may equally well be affirmed that the apelet's ultimate progenitor was a stone; so you reply:

(b.) Certes, no stone is a living being;
But some men are stones;
Therefore some men are not living beings, which is absurd.

Distinguish the relative value, force and use of the indirect and direct arguments.

4. Give an example of an *argumentum ad veritatem* and of an *argumentum ad hominem*. Why are the former called *objective* or *absolute*, and the latter *subjective* or *relative*? What is their respective value? When is the use of subjective arguments never admissible? What is meant by arguing *ex concessis*? What is retorsion?

5. What are (a.) *Progressive* and *Regressive* arguments, (b.) *Main* and *Subordinate* arguments. Adduce an example of each.

6. What is the popular distinction between *Deduction* and *Induction*? Why is it faulty? Why is it incorrect to identify Deduction and Demonstra-

tion, and to consider Induction a form of reasoning altogether distinct from demonstration?

7. What is (a.) the wide, (b.) the exact meaning of *Deduction?* What is its most general formula? The following are examples of deductive arguments; show how they are so, and trace the *a posteriori* element in each:

(a.) Every corporeal substance has in itself quantity and force;
But every atom is a corporeal substance;
Therefore every atom has in itself quantity and force.

(b.) All good men are estimable;
But some good men are not esteemed;
Therefore some who are not esteemed are estimable.

8. What is the (a.) wide, (b) the exact meaning of *Induction?* Name its formula; and, from any example, trace the *a posteriori* element in induction.

Why is complete induction practically impossible? Why is it useless? How far is it necessary to carry incomplete induction in any given case? Upon what axioms is it based? For what reason? Why are the principles contained in these axioms universal and necessary? In what circumstances and by what is this universality and necessity conditioned? Prove that an inductive argument is essentially demonstrative.

What rules should be observed in inductive arguments? Give a reason for each rule.

An inductive argument, because it is a logical argument, is beyond a doubt in logical form: prove how this is the case (a.) in complete, (b.) in incom-

plete induction. What right have we to make use of the suppressed premiss in induction? Prove how in induction we are really reasoning about universals throughout, although we are said to proceed from the particular to the universal. How can you meet the difficulty that an induction is an invalid syllogism, because the conclusion has greater extension than the premisses?

What is the value of induction in science? Why? How far is induction a method of everyday reasoning? Why may not induction be applied to facts of the moral order?

9. What are Probable Arguments?

XXVI. 1. Explain what is meant by an argument from *Analogy*. Distinguish its three kinds. Why are these arguments not demonstrative? Upon what does their degree of probability depend? What is their use? Examine the following; name the kind, and say what you think of the force of each, supporting your opinion by reasons:

(a.) For a transitory gain men labour and toil; much more therefore should they labour for an eternal reward.

(b.) Springs are little things, but they are sources of large rivers; a helm is a little thing, but it governs the course of a ship: so, therefore, are words and looks, which are little things, powerful for good or evil.

(c.) The author of *Antoine de Bonneval*, thus supports the proposition that differences of mind as well as likenesses contribute to the charm of free colloquial intercourse: "As in music, so is it likewise in discourse. There are in the first, not

only recurring octaves, that ring out to each other immediately in clear response, but also deflections, regular intervals, and subtle gradations from key to key, and approaches to actual discord, that mingle and intertwine to perfect the melody in its progress. So, too, in the intercourse of one thoughtful mind with its fellow, it is as much the evolving of differences, salient but not irreconcilable, demanding energy of argument to sustain, and breadth and reach of thought to test them, that make the charm of free discourse, as thoughts that actually chime together, and conclusions which have been reached by a similar process of reason."

(d.) The safety of that upper storey has been secured by its timber beams; therefore it will remain secure when they are replaced by iron.

(e.) If the "Masters in Israel" speak such things; therefore may we, insignificant mortals.

(f.) As the tongue is like a race-horse, which runs the faster the less weight it carries; so, therefore, can those who talk on trifles speak with the greatest verbal fluency.

2. What is an argument from *Congruity?* What is its use,—its form,—its scientific value?

3. Answer the same questions regarding *Hypothesis.* What is a *theory* in science? What conditions must be observed in every argument from hypothesis?

XXVII. 1. What is scientific knowledge in relation to demonstration? What is in its subjective aspect? Why does it mainly regard the *causes* of the thing known?

2. Causes are of four kinds: name and explain

each kind; then give an illustration embracing all the four.

3. What have causes to do with scientific knowledge considered objectively? Why is scientific knowledge essentially *system?* Prove now how it is the result of method.

4. St. Thomas says, "there are three, and three only requisites for science:" what are they? What connection is there between them and the twofold description of scientific knowledge?

5. Why must the first principle of any system be true? What would result from starting from a wrong point, and using a wrong method? What is the "right place" of any part in a system? Nothing unproved may be admitted into a system: why is every *lemma* an exception to this rule? What are corollaries? Why are they admitted unproved?

XXVIII. 1. What is the difference between the material and formal object of a science? Illustrate the distinction by an example.

2. What is meant by the *subordination* and *superordination* of the sciences? What is the ground of this gradation?

3. Metaphysics is supreme among sciences: why? What is its subject-matter? Why is not this supremacy assigned to Dogmatic Theology?

4. Explain the term *subalternation* of the sciences. What makes some sciences subalternate, and why? Give some examples.

XXIX. 1. What is (a.) the theoretic, (b.) the practical end of Knowledge?

2. In what sense is it true to say that philoso-

phical or scientific knowledge is its own end? For what reason? How does subjective knowledge and its subjective end connote Truth and Certainty?

C.

What is the "end of the act of the agent" in Logic? In treating of it how many and what things have to be considered?

I. 1. In what does the *material* truth of thought consist as distinguished from its *formal* truth? Why is it called *conceptual* truth?

2. How far does conceptual truth represent the object of thought?

3. What is material error?

4. Why and how does material truth reside primarily in the judgment, and not in simple apprehension?

5. Explain how the same thing happens with respect to error; and say why error is called assent to a false, or dissent from a true proposition.

6. Why are there necessarily many classes of conceptual truth? Distinguish supra-rational and rational truths, and illustrate the distinction by examples. Why can supra-rational truths never be contrary to reason? What do you understand by saying that they are either negatively or positively according to reason?

7. What is (a.) a necessary, (b.) a contingent truth? When is a truth (a.) absolutely, (b.) hypothetically necessary?

8. Distinguish and give examples of truths (a.) *a priori* and *a posteriori;* (b.) analytic and synthetic; (c.) ideal and experimental; (d.) mathematical,

metaphysical, and physical; (e.) moral and religious; (f.) theoretical and practical.

II. 1. What is *ignorance* with regard to truth?

2. What is (a.) objective, (b.) subjective *doubt?* What is its cause? How is it stated by St. Thomas? How does that statement indicate two kinds of doubt?

3. Distinguish objective and subjective *opinion.* Give St. Thomas' statement of the latter. Explain the cause of opinion, as a mental state; and give some examples of it.

4. What is objective *certainty?* Why must it be synonymous with truth? What is subjective certainty or certitude in its restricted and in its wide meaning? What is its object, according to St. Thomas? Why is subjective certainty in its wide meaning not necessarily conjoined with truth?

5. Explain how ignorance, doubt, and opinion are attitudes of the mind with respect to error as well as with respect to truth?

III. 1. Explain shortly the kinds of objective certainty, *i.e.*, certainty considered as a quality of propositions.

2. How may subjective certainty, *i.e.*, certainty considered as a state of the mind, be either metaphysical, physical, or moral? Give examples.

3. Why is it true to say that subjective certainty may, and must admit of degrees?

4. What is the difference between (a.) natural and scientific, (b.) natural and supernatural certainty.

5. If I am certain of the following propositions, what kind of certainty have I in each case:—Venus is not inhabited by human beings; two and two

are four; the sun will rise to-morrow; Ireland will eventually become prosperous; the lime-trees will be in full leaf in two months.

6. I am certain that the Second Person of the Blessed Trinity became Incarnate: that Jerusalem was destroyed by the army of Titus; that the flowers I have just put into water will be faded in two days; and I am certain, after working out the problem, that in equal circles, equal angles stand upon equal circumferences, whether they be at the centres or circumferences:—what kind of certainty have I in each case?

IV. 1. What is the twofold signification of a "source of knowledge"? What, their twofold character?

2. Name the sources of knowledge. What points form the subject of our inquiry in treating of each one?

3. What is *internal experience*, or *self-consciousness?* Whence does it result? What truths do we get to know by its means? Name the reasons for its trustworthiness.

4. What is *external experience?* Upon what does it depend? What objects do we come to know by its means? In what relation? Upon what two conditions does the report of the senses depend? Upon what conditions does the trustworthiness of their report depend? Why cannot the trustworthiness of the senses, as a source of knowledge, be matter for doubt, if these conditions are present?

5. Why is *Reason* called a source of knowledge? Why and how is it twofold in this character? What is the *discernment or light of reason* considered

as a source of knowledge? Mark a distinction in the light of reason similar to that in subjective knowledge. What are the truths cognized by this means? Show to what extent its testimony is trustworthy.

6. What is *common sense?* Prove that it is a form, or rather an exercise of reason. In what does it differ from the exercise of the discernment or light of reason? What kind of truths come to us by way of common sense? Enumerate some of them. What are the conditions which ensure its trustworthiness? Given these conditions, why is its trustworthiness beyond doubt?

7. From what does *Authority*, as a source of knowledge, proceed? What is faith as the correlative of authority? Upon what does faith depend as a ground for certainty? What is (a.) a witness, (b.) testimony? What truths do we get to know from *human authority?* What is the value of dogmatic testimony as a motive of certainty? What is its value as an instructor? Give some examples.

8. What is the office of historical testimony? What are its three channels? Its trustworthiness depends primarily on the credibility of the witnesses, and this in its turn depends on certain conditions: what are they? Upon what does the integrity of human testimony depend? What are the ordinary grounds for belief in human testimony?

9. Is *Divine Authority* a natural source of knowledge? Is the knowledge of Revelation natural or supernatural knowledge? Why? Why is it necessary to consider Divine Authority among the sources of knowledge? What classes of truths do

we know by its means? How far is Revelation a necessary medium for the knowledge of each class? What guarantee have we of the trustworthiness of Revelation. The duty of accepting it presupposes two conditions: what are they?

V. 1. Why are the natural sources of knowledge insufficient criteria of Truth? What further criterion is needed? Why?

2. This criterion cannot be simply subjective: why not? What *is* the *Criterion of Truth?* Think over the definition: then explain *how* the Criterion is mainly objective, and in some measure subjective.

3. Distinguish and illustrate metaphysical, physical, and moral objective evidence. Then distinguish (a.) extrinsic and intrinsic, (b.) immediate and mediate objective evidence. What is the subjective meaning of evidence?

4. Does objective evidence *actually* induce the intellect to assent, and determine it to pronounce a judgment in the generality of cases? What does? Why so? Distinguish it from objective evidence. Give some examples.

5. Can false propositions ever be evident? How comes it then that we consider them so?

6. Is Objective Evidence the Criterion of Truth for the Truths of Revelation? What is? For what natural truths is this criterion a safer one than objective evidence? Why is it a negative criterion for all natural truths? Why is the assent of faith always a free act?

7. Why is the question of Conceptual Truth and Certitude of such importance?

VI. 1. Two classes of conclusions may be drawn

from its examination. Name those of the theoretic class, and show how they are the outcome of what has been said on Method, Truth, and Certainty.

2. What is the way to rid ourselves of prejudices? Why are the dominion of feeling and passion, and one-sidedness in our mental habits, inimical to the attainment of truth? How is the study of Logic conducive to its attainment?

3. A habit of shirking the labour of thought stands in the way of the attainment of Truth: why? Why is this habit often accompanied with "viewiness"? Method in study and reading, and control of the imagination minister to the attainment of Truth: why?

4. Verbosity and its contrary, excellence of style, are sometimes calculated to lead minds away from truth: why? and in what circumstances?

5. Why should we consider ourselves obliged to aim at securing mental accuracy?

6. Do all the foregoing rules apply to mental relaxation? In what measure does relaxation minister to the attainment of Truth? If we take them for the direct road to it, what will be the character of our certainties?